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KICK-OFF MEETING

FOR THE REVIEW OF THE

REFERENCE DOCUMENT ON BEST AVAILABLE TECHNIQUES

FOR THE FOOD, DRINK AND MILK INDUSTRIES

SEVILLE

27 – 30 OCTOBER 2014

BACKGROUND PAPER

INTRODUCTION

The Industrial Emissions Directive (IED) (2010/75/EU) lays down a framework requiring Member States to issue operating permits for certain installations carrying out industrial activities described in its Annex I (energy industries, production and processing of metals, mineral industry, chemical industry, waste management, and other activities-including food drink and milk industries). The Directive stipulates that permits must contain conditions based on **Best Available Techniques (BAT)** as defined in Article 3(10) of the Directive, to achieve a high level of protection of the environment as a whole.

BAT reference documents (BREFs), such as the Food, Drink and Milk (FDM) BREF, serve as the reference for permit authorities within the procedure of issuing permits to installations. BREFs are also used by the industry concerned in preparing applications for operating permits. Additionally, BREFs are a source of information for other interested parties on ways to minimise the environmental impacts of industry. BAT is a dynamic concept because new techniques may emerge, science and technologies are continuously developing, and new environmental processes are being successfully introduced into industry. Since the elements of BAT change over time, BREFs have to be reviewed and updated as appropriate.

This Kick-off meeting (KoM) will determine/clarify the review process for the existing FDM BREF (August 2006) so that TWG members are aware of the specific tasks needed to deliver a high-quality BREF review according to the agreed timetable.

The European Commission's Joint Research Centre (JRC) is currently also developing a Sectoral Reference Document (SRD) on best environmental management practices (BEMPs) regarding food and beverage manufacturing. Drafting of the SRD is unconnected to the FDM BREF and is part of the European Commission's work to implement the EU Eco-Management and Audit Scheme (EMAS) Regulation.

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DISCLAIMER

This document should not be considered as representative of the Commission's official position. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of the following information.

Acronyms used in this background paper

BAT	Best Available Techniques
BAT-AEL	BAT-Associated Emission Level(s)
BAT-AEPL	BAT-Associated Environmental Performance Level(s)
BREF	Reference Document on Best Available Techniques
BP	Background Paper
CLM BREF	Best Available Techniques (BAT) Reference Document for the Production of Cement, Lime and Magnesium Oxide
CWW BREF	Best Available Techniques (BAT) Reference Document for Common Waste water and Waste Gas Treatment/Management Systems in the Chemical Sector
D1	First draft
ECM	Economics and Cross-Media
EFS BREF	Reference Document on Best Available Techniques on Emissions from Storage
EIPPCB	European IPPC Bureau
ENE BREF	Reference Document on Best Available Techniques for Energy Efficiency
EMAS	EU Eco-Management and Audit Scheme
EMAS BEMP	EMAS Best Environmental Management Practices
EMS	Environmental Management Systems
EOW	End-of-Waste
ICS BREF	Reference Document on the application of Best Available Techniques to Industrial Cooling Systems
KoM	Kick-off Meeting
LCP BREF	Reference Document on Best Available Techniques for Large Combustion Plant
NOCs	Normal Operating Conditions
OTNOCs	Other Than Normal Operating Conditions
SA BREF	Reference Document on Best Available Techniques in the Slaughterhouses and Animals By-products Industries
ROM	JRC Reference Report on Monitoring of emissions from IED-installations (Final Draft, 2013)
SRD	Sectoral Reference Document (issued under the EMAS Regulation)
UWWTD	Urban Waste Water Treatment Directive 91/271/EEC
UWWTP	Urban Waste Water Treatment Plant
WFD	Waste Framework Directive 2008/98/EC
WI BREF	Reference Document on the Best Available Techniques for Waste Incineration
WT BREF	Reference Document on Best Available Techniques for Waste Treatment
WWTP	Waste Water Treatment Plant
MS	Member State
AT	Austria
BE	Belgium
DE	Germany
DK	Denmark
ES	Spain
ES-AND	Spain Andalucia

ES-CAT	Spain Catalonia
FI	Finland
FR	France
IE	Ireland
IT	Italy
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
UK	The United Kingdom
AAF	European Starch Association
ANIA	French Food Industry Association
ATLA	French Dairy Union
AVEC	Association of Poultry Processors and Poultry Trade in the EU countries
CEFS	EU Sugar Association
CLITRAVI	Liaison Centre for the Meat Processing Industry in the EU
DN	The Danish society for nature conservation
EDA	European Dairy Association
EEB	European Environmental Bureau
FEDIOL	EU Vegetable Oil and Proteinmeal Industry
FEFAC	European Feed Manufacturers Federation
FDE	FoodDrinkEurope
SNFS	French Sugar Manufacturers Association
UNGDA/SNPAA	French Ethanol Makers Association
VDM	German Dairy Association
MIV	German Dairy Industry Association
Chemical oxygen demand (COD)	Amount of oxygen needed for the total oxidation of the organic matter to carbon dioxide. COD is an indicator of the mass concentration of organic compounds.
Biochemical oxygen demand (BOD _x)	Amount of oxygen needed for the biochemical oxidation of the organic matter to carbon dioxide in x days (normally 5 or 7). BOD is an indicator for the mass concentration of biodegradable organic compounds.
Total organic carbon (TOC)	Total organic carbon, expressed as C, includes all organic compounds.
Total suspended solids (TSS)	Mass concentration of all suspended solids, measured via filtration through glass fibre filters and gravimetry.
Total nitrogen (TN)	Total inorganic nitrogen, expressed as N, includes free ammonia and ammonium, nitrites and nitrates.
Total phosphorous (TP)	Total phosphorous, expressed as P, includes all inorganic and organic phosphorous compounds, dissolved or bound to particles.
TVOC	Total volatile organic compounds (in air), expressed as C (EN 12619)
NO _x	The sum of nitrogen (II) oxide (NO) and nitrogen dioxide (NO ₂) expressed as NO ₂

1 GENERAL INFORMATION

1.1 The Food, Drink and Milk (FDM) BREF

The original work on the Food, Drink and Milk Industries (FDM) BREF was conducted between 2001 and 2005 and the BREF was formally adopted by the Commission in 2006. The review of the FDM BREF is the sixteenth BREF review of an existing BREF to be launched. A list of Best Available Techniques (BAT) reference documents can be found at the webpage of the European IPPC Bureau (<http://eippcb.jrc.ec.europa.eu/reference/>).

The drafting of a new BREF on Wood-Based Panels Production and the review of the reference document on General Principles of Monitoring are also in progress.

1.2 Objectives of the FDM BREF review

The FDM BREF covers a number of different sectors and processes that deal with the production of a variety of food, drink and feed products.

The main goal of the review is

- to bring the FDM BREF in line with the IED
- to revise the BAT conclusions, where the data and information collection is the most important step in the exchange of information within the TWG.

As recommended in the 'Concluding remarks' chapter of the current FDM BREF (see Section 7.5, 'Recommendations for future work'), the quantitative information presented in the chapters entitled 'Current emission and consumption levels' and 'Techniques to consider in the determination of BAT' needs to be significantly enhanced. The collected consumption and emission data should be linked to:

- the product;
- the process;
- the operating conditions;
- the sampling, and analytical methods;
- and, last but not least, linked to applied techniques.

Moreover, the applicability of potential BAT and economic information on investment and operating costs should be further developed.

1.3 Process to review the FDM BREF

The general timeline for the review of a BREF is given in the BREF Guidance¹ (see BREF Guidance Section 1.2.4) and the approach to take was further agreed at the IED Article 13 Forum meeting of 6 June 2013². The FDM TWG will work using the following approach:

- 'Front-load' the exchange of information to achieve the best preparation for the Kick-off meeting (KoM). The frontloading corresponds to Step 3 "call for expression of initial positions on core issues" in Table 1.
- Adopt a more focused approach to the overall FDM BREF review process by:
 - targeting the most polluting sectors;
 - targeting a limited number of key environmental issues;
 - collecting sound and reliable data, followed by appropriate data processing;
 - focusing on BAT conclusions (and the associated BAT candidate chapter).
- Tackle difficult issues with working drafts.
- Strictly limit the possibilities for time slippages.

The timetable for the next steps for the review of the FDM BREF will be discussed at the KoM but the main envisaged milestones and deadlines are summarised in Table 1.

Table 1: Milestones for the review of the FDM BREF

Step	BREF review milestones	FDM BREF review
1	<i>Reactivation of the TWG</i>	16/12/2013
2	<i>Nomination of TWG members</i>	The deadline was 31/01/2014 To date, 142 members have been nominated
3	<i>Call for expression of initial positions on core issues</i>	16/04/2014 By the 30/05/2014 deadline a total of 985 positions had been received from the FDM TWG.
4	Kick-off meeting (KoM)	27-30 October 2014
5	TWG members submit to the EIPPCB a list of well-performing installations/plants which will participate in the data collection	19 December 2014 (tentatively)
6	Release of questionnaires for the data collection	31 January 2015 (tentatively)
7	Collection of information and data (3-month period)	30 April 2015 (tentatively)
8	First draft of the revised BREF	Tentatively: end of 2015
9	Commenting period on the first draft	Tentatively: end of 2015 – April 2016
10	Final TWG meeting	Tentatively: last quarter 2016
11	Final draft delivered to the IED Article 13 Forum	Tentatively: last quarter 2016 – first quarter 2017

¹ Commission Implementing Decision (2012/119/EU) of 10 February 2012 laying down rules concerning guidance on the collection of data and on the drawing up of BAT reference documents and on their quality assurance referred to in the Industrial Emissions Directive 2010/75/EU (IED): <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:063:FULL:EN:PDF>

² Work programme for the exchange of information under Article 13(3)(b) of the IED for 2014, section 4. Consequences for the working methods of the TWGs.

1.4 Objectives of the Kick-off meeting

The main aim of the KoM is to agree on the main issues that the review of the FDM BREF will focus upon, including:

1. the scope of the BREF and BAT conclusions (see Section 2.1);
2. the key environmental issues to focus the data collection on;
3. the type and format of the data/information needed for the review, sector-specific template(s) for collecting and reporting information), see Sections 2.2 and 2.3.

The above main aim will be facilitated by:

- getting to know each other as members of the TWG for the review of the FDM BREF;
- discussing the initial positions expressed by the TWG members in view of the objectives of the review;
- identifying specific contributors for data/information;
- setting deadlines for the provision of new information (see steps 5 to 7 in Table 1 above);
- agreeing to a forward plan for the whole project (see steps 5 to 11 in Table 1 above).

As a result of this KoM, the review process for the FDM BREF will be clarified so that the EIPPCB can present the planned work schedule and the TWG can be assigned clear tasks.

In particular, conclusions should be reached on the nature and extent of the information to be collected during the review, as follows:

- on how to develop, distribute and collect questionnaires for data and information collection;
- on how to ensure the quality and representativeness of the data set needed to derive BAT conclusions.

The KoM will also provide the opportunity to inform TWG members on issues that need to be treated consistently among BREFs, in particular:

- the interactions with other BREFs;
- ways to deal with potentially confidential business information and sensitive information under competition law, conflicts of interest and related matters;
- the specific tool that the TWG will use to collect, exchange and analyse information. In particular, BATIS (the BAT information system) will be presented to the TWG, as well as the procedures to submit information identified at the KoM.

During the KoM, there will be time to discuss the TWG members' positions. The discussions will necessarily be kept general, and discussions will not enter into deep technical debates. For example, positions on techniques and on whether a particular technique is BAT will not be discussed at this stage, as answers to questions of this nature need to be informed by the upcoming data collection exercise. However, these initial positions will be looked at later together with the other information collected (e.g. data from the questionnaires, other contributions).

1.5 Structure and overview of this background paper

In response to the call for expression of initial positions (EIPPCB e-mail dated 16/04/2014), TWG members submitted a total of 985 positions.

This background paper (BP) examines groupings of these positions in order to address the main issues of the review of the FDM BREF, according to the indications given in the BREF Guidance.

In order to facilitate the discussion during the KoM, the TWG initial positions have been analysed and grouped into subject groups described in the next chapters.

Items grouped in Section 2 represent the issues that the EIPPCB proposes to be discussed at the KoM. These are the items considered the most important in terms of obtaining clarification before starting the drafting process to revise the FDM BREF and according to the indications given in the BREF Guidance.

Although it is not anticipated that the positions on items described in Section 3 will be discussed at the kick-off meeting, the EIPPCB have included these in this BP together with an assessment and proposal of how to handle the positions and the related information. Whenever necessary, the EIPPCB will provide clarification during the kick-off meeting if useful to the discussion.

Each individual item in this background paper is presented in a table that is structured as follows.

Table 2: Explanation of how the items in this background paper are presented

Summary of initial positions
This cell contains a summary of the TWG members' initial positions. The full text of the position is not usually provided. For more details on the initial positions (in particular, the underlying rationale), please refer to the compiled list of initial positions that can be found in BATIS.
At the end of each position statement, a list of codes identifies the TWG member(s) (e.g. Member States, industry associations, environmental NGOs) and the related position(s). As an example, (AT 1) refers to Position 1 from Austria.
When the TWG member is followed by a "doc3" it refers to additional positions given by SE in the excel template "doc3" (see "Guidelines for expression of positions" 16 April 2014).
New information identified
This cell identifies if the information: <ul style="list-style-type: none"> a) has already been provided (usually with the initial position sent); or b) has already been identified and will be provided later in the review process; or c) has not yet been identified by the initial positions.
EIPPCB assessment
This cell contains the EIPPCB's assessment of the positions and new information, and forms the basis for the proposal(s).
EIPPCB proposal
This cell contains the EIPPCB's proposal(s) to develop or resolve the issue.

1.6 Before coming to the meeting

If a TWG member considers that issues other than the ones proposed in Chapter 2 need to be discussed at the KoM, they are invited to send their request to the FDM BREF review team (e-mail JRC-IPTS-EIPPCB-FDM@ec.europa.eu) **before 17 October 2014**. Such a request must also include the rationale for each new item proposed.

TWG members are asked to bring to the meeting at least the following documents:

- a copy of this background paper;
- the compiled list of initial positions posted in the BATIS forum for the FDM BREF;
- the original FDM BREF (adopted by the European Commission in August 2006);
- the BREF Guidance (Commission Implementing Decision 2012/119/EU);
- the guidelines for the expression of initial positions on the review of the FDM BREF (dated 16/04/2014).

To enable meaningful discussion at the KoM, it is important that TWG members have read this background paper in advance of the meeting.

2 ITEMS FOR DISCUSSION AT THE KICK-OFF MEETING

2.1 SCOPE

This section aims to steer discussion on the scope of the FDM BREF and BAT conclusions. It includes proposals from the EIPPCB on the issue. An updated proposal for the scope of the BREF is presented in Annex I.

2.1.1 Scope of activities and sectors

Summary of initial positions

General positions

- Scope should be more detailed (DE 1).
- It is important that the scope will be clarified (RO 1).
- The IED Annex I definition is too broad and leaves too much room for interpretation of permit writers. Develop the scope of BREF to identify all the activities included in it (ES 6, 107).
- Scope should be based on the activities specified in Annex I, points 6.4 (b) (i),(ii) (iii) and c) (UK 1; FDE 47).
- The list of activities excluded from current BREF should be carried over into the revised BREF (UK 1; FDE 48).
- It should be discussed whether the scope should be limited to foodstuffs covered by Regulations 852/2004 and 853/2004 (CLITRAVI 36).
- BAT conclusions should not refer to or cover issues already covered in other legislation (EDA 11, 12).

Animal feed

- Activities covered by the term animal feed should be clarified. It should be clarified what type of installations are covered by the term production of animal feed from vegetable raw material (DK 4, 5).
- Animal feed not only covers feed to "farm animals", but also feed to animals used for the production of fur (CLITRAVI 60, ES 32).
- Add descriptions and BAT for animal feed, e.g. drying of green fodder (DE 63).
- Dehydration of fodders should be explicitly included (FR 2).
- The current BREF does not address the specific matters of the animal feed manufacturing processes (FEFAC 1).
- Animal feed compounding is a notable omission from Chapters 3-5 of the current BREF (UK 8).

Ethanol production

- Include the processes for bioethanol production (AAF 7; CEFS 1; SNFS 1; UNGDA 2).
- Include description of the production of ethanol based on of agricultural raw materials, even in large volumes (DE 7).
- Ethanol production should be included, independently of the administrative issues linked to the final destination of alcohol, biofuel or ethanol for drinks, but it should be distinguished from spirits production (FR 6, 16).
- Bioethanol production by fermentation/distillation of by-products/ production residues from starch manufacture/sugar beet processing should be included (UK 6).
- Installations whose main purpose is to manufacture biofuel (e.g. ethanol, etc.) should not be included (ES 3).
- Avoid the inclusion of non-food sectors and particularly the bio-ethanol sector (spiritsEUROPE 1, 2).

Starch plants

- Include the hydrolysis step (production of glucose syrup, dextrose, maltodextrine) performed in several starch plants (FR 3). Discuss the inclusion of further steps, e.g. hydrogenation and fermentation, but take into account relevant produced waste waters (FR 3; ANIA 28).

Anaerobic digestion

- Expand coverage within current BREF to anaerobic digestion. A distinction should be made between those anaerobic digestion processes used primarily to produce renewable energy and those for waste treatment (FDE 53, 68, 73, 76; UK 3). Take account of developments in anaerobic digestion techniques that enable high rate /high solids/ fats effluent streams to be treated (UK 7).

Other issues

- Clarify in which category of Annex I installations using milk as the primary raw material with ingredients of vegetable origin, i.e. cacao, are included (DK 2).
- Clarify if soft drinks production is outside the scope when no vegetable (or animal) raw materials are used, e.g. only water, CO₂, artificial sweeteners, artificial essence (FI 15; DE 1).
- Exclude off-site sludge treatment or valorisation (FR 8).
- Specify if an installation of lime production within the sugar industry is covered by the CLM BREF (FR 10). The specific nature of lime kilns in the sugar industry should be taken into account (PL 2).

New information identified

Ethanol production

- Information and data could be provided by the AAF.
- Information on ethanol production processes and data will be provided by DE.
- FR will contribute to data collection.
- UK could provide data from two ethanol plants associated with sugar beet production and starch manufacture respectively.

Animal feed

- UK could provide related data.

Anaerobic Digestion

- Performance data available from UK, from applications in dairy, whisky and confectionery sectors.

EIPPCB assessment

General positions

- A BREF does not interpret or alter any EU legislation. The scope of the BREF and BAT conclusions should be based on the activities specified in Annex I, points 6.4 (b) (i) (ii) (iii) and c) of the IED.
- The scope of the BREF and BAT conclusions should be clear, mentioning any exemptions and possible overlap with other BREFs.
- Regulations 852/2004 and 853/2004 refer to hygiene rules for food of animal origin and the environmental perspective is different.
- To help the readability and user-friendliness of the BREF, the scope will include an updated clarification on exclusions and a table referring to interfaces with other BREFs and/or legislation.

Animal feed

- Point 6.4 (b) of Annex I to the IED refers to "Treatment and processing, other than exclusively packaging, of the following raw materials, whether previously processed or

unprocessed, intended for the production of food and feed...".

- Production of feed is already within the scope of the adopted FDM BREF.
- Animal feed should in principle include any type of feed produced from animal or vegetable raw materials.
- Drying of fodder is a treatment activity in animal feed production as well as the production of feed for fur animals and should be in the scope of the FDM BREF. However, production of primary products from animal by-products (e.g. from rendering) should be excluded, since this is covered in the SA BREF (see Section 2.1.2 on interface with the SA BREF).
- The descriptions in the current FDM BREF need to be improved for animal feed production in general and specifically for compound feed production.
- Missing information on products, processes, related techniques and emission and consumption data should be collected.

Ethanol production

- Ethanol production is carried out mainly by fermentation, and falls under the activity description of point 4.1(b) in Annex I to the IED (i.e. 4.1 Production of organic chemicals, such as ... (b) oxygen-containing hydrocarbons such as alcohols...), noting that activity 4 covers chemical production "**on an industrial scale by chemical or biological processing**".
- While ethanol-containing beer, wine and spirits are covered by the FDM BREF, ethanol production is part of the reviewed LVOC BREF (Draft 1, 2014) as a *Thumbnail* description and with a reference to the FDM BREF for further general information about fermentation processes.
- Common upstream and downstream treatment and processing would be covered by the FDM BREF, such as grain milling and animal feed production from distillers spent grains.
- Fermentation in relation to production of beverages is described in the current FDM BREF, while dedicated ethanol production is not.
- The purification and distillation in dedicated ethanol production is not described in the FDM BREF.

Starch plants

- The main processes and products within the starch sector should be described in the BREF.
- Hydrolysed starch products such as sorbitol and mono- and polysaccharides (e.g. glucose and maltodextrin) are important downstream products produced from starch (used as a food ingredient, food substance or food additive or for non-food and non-feed products).
- The processes related to the production of most of these value-added products involve chemical or enzymatic hydrolysis and hydrogenation, which are processes, that would be better covered by one of the chemical BREFs.
- The product group of hydrolysed starch products are however not covered in a chemical BREF as a product category nor are the related processes described.

Anaerobic digestion

- Anaerobic digestion of waste is covered by the WT BREF. A cross-reference could be made to the WT BREF for general information and recent developments in the digestion process.
- Anaerobic digestion is a technique to treat food residues from the production process and it could be included as a potential BAT candidate.
- If raw materials, process equipment and operation differ greatly from what is already covered in the WT BREF, these could be described in the FDM BREF.
- Related on-site activities before and after the anaerobic digestion process, which is characteristic of the FDM installation, could be described within the scope of the FDM BREF (e.g. energy generation from produced biogas).

Other issues

- Treatment and processing of milk, including milk-based products with ingredients of vegetable origin, e.g. cacao or fruit will be covered by the BREF. The activities specified

in point 6.4 c) refer to the treatment and processing of milk only.

- Production plants that do not use animal or vegetable raw materials do not fall under the activity 6.4 (b) in Annex I to the IED and should not be covered in the FDM BREF.
- Off-site activities, like off-site sludge treatment, are outside the scope of the FDM BREF.
- The production of lime is covered by the CLM BREF and repetition should be avoided.

EIPPCB proposal

General positions

- To include the activities specified in points 6.4 (b) (i) (ii) (iii) and c) of Annex I to the IED in the scope of the revised FDM BREF.
- To maintain the current exclusion of activities in the revised FDM BREF and to specify any necessary further exclusions (see Annex I).
- To take into consideration relevant interfaces with other BREFs and include a reference to other BREF or REF documents in the scope of the FDM BREF and in the FDM BAT conclusions.
- To not explain or reinforce in the scope of the BAT conclusions, any legal references to EU legislative acts. Factual references to EU legal acts can be made in the BREF, where deemed necessary.

Animal feed

- To maintain the production of animal feed of animal and vegetable origin in the scope of the FDM BREF.
- To further develop the descriptions of products, processes and techniques in the production of animal feed.

Ethanol production

- To collect more information on ethanol sector in general (e.g. number, size/capacity and location of plants - both the ones integrated in FDM sites and standalone plants).
- To include in the FDM BREF related descriptive information on the fermentation and related used raw materials.
- To add a cross-reference to the LVOC BREF.

Starch sector

- To provide only descriptive information on the related production processes of secondary products derived from starch (e.g. hydrolysed products).

Anaerobic digestion

- To make a cross-reference to the WT BREF for general information on the anaerobic digestion of waste and include descriptions of raw materials, process equipment and operation specific to the FDM sector, to the extent that these are not already covered in the WT BREF.
- To collect the necessary information and data in order to assess whether anaerobic digestion should be a potential BAT candidate.

Other issues

- To exclude activities where no animal and vegetable raw materials are used.
- To exclude off-site sludge treatment or valorisation of sludge from the scope of the FDM BREF.
- To make a cross reference to the CLM BREF concerning lime production in sugar plants.

2.1.2 Interface with the SA BREF

Summary of initial positions

- Indicate clearly in the scope what falls under the SA BREF and what under the FDM

<p>BREF and the potential links between them both (DK 1, ES 8, FR 9, AVEC 1).</p> <ul style="list-style-type: none"> The level of slicing and processing of animal raw material covered by the FDM BREF should be further clarified (DK 3).
<p>New information identified</p> <ul style="list-style-type: none"> No new information identified at this stage.
<p>EIPPCB assessment</p> <ul style="list-style-type: none"> The slaughterhouse-related activities In Annex I to the IED are: <p>6.4. (a) <i>Operating slaughterhouses with a carcass production capacity greater than 50 tonnes per day</i></p> <p>6.5. <i>Disposal or recycling of animal carcasses or animal waste with a treatment capacity exceeding 10 tonnes per day</i></p> <p>The scope of the adopted SA BREF (2005) covers these activities.</p> In the scope of the adopted SA BREF (2005) it is mentioned that: <p><i>The “slaughter” activity is considered to end with the making of standard cuts for large animals and the production of a clean whole saleable carcass for poultry. Directly associated activities of the slaughter process are included.</i></p> Directly associated activities could be the process of marinating the produced standard cuts, as an integral part of the slaughterhouse installation. In addition, the scope of the SA BREF also states that: <p><i>Activities after the standard cuts are made (except chilling at slaughterhouses) may be covered by the “Food, drink and milk” BREF.</i></p> Animal by-products related activities are covered in the SA BREF and there is a detailed list in the SA BREF scope of what these activities include. The BREF Guidance (2012/119/EU) clarifies that there is no priority among the BAT conclusions of different BREFs, but consistency is sought throughout the BREF series. Where necessary, reference will be made to other BREFs like the SA BREF. The scope section in a standard BAT conclusion document will contain a table of other relevant BREFs.
<p>EIPPCB proposal</p> <ul style="list-style-type: none"> To include in the scope of the FDM BREF a clarification of the interface between the FDM and SA BREFs, that could be as follows: <p><i>The “Slaughterhouses and animal by-products BREF” (SA BREF) covers the slaughtering of animals, its directly associated activities and a wide range of animal by-products treatment activities. The “slaughtering” activity is considered to end with the making of standard cuts for large animals and the production of a clean whole saleable carcass for poultry.</i></p> <p><i>Therefore, this document (FDM BREF) does not cover the production of primary products produced from animal by-products, such as rendering and fat melting; fish-meal and fish oil production; blood processing and gelatine manufacturing.</i></p>

2.1.3 Combustion Plants and interface with the LCP BREF

<p>Summary of initial positions</p> <ul style="list-style-type: none"> • Only combustion plants which are an integral part of the production process should be included (CLITRAVI 32, 38; EEB 3). • Sector-specific combustion units, should be covered only where the flue gases have direct contact with products, (DE 3, DK 6). • Include small steam boilers and/or furnaces with the use of non-conventional fuels, occasionally from by-products or residues (ES 1). • Combustion plants other than those covered under Chapters III and IV of Directive 2010/75/EU should be excluded (FDE 7). Items covered by Chapters III and IV of Directive 2010/75/EU and the future EU Directive on Small and Medium Combustion Plants should be excluded in order to avoid double regulation and overlaps (FDE 49, 60). • Only installations of combustion for direct use like direct dryers should be covered (FR 7). • Exclude combustion plants but include reference information concerning those combustion plants that could be specific to the FDM sector (IT 1). • LCPs (total rated thermal input \geq 50 MW) operated as part of FDM installations (especially for sugar production) should be covered (PL 1). Exclude from the scope of FDM BAT conclusions combustion plants smaller than 50 MW, except for process-integrated operations or combustion plants that are part of direct dryers (PL17). • It is important to clarify whether combustion plants should be excluded (RO 2). • Exclude combustion plants, except plants in which the products of combustion are used for direct heating, drying or any other treatment of objects or materials (SE 3). • Only sector-specific units, e.g. direct fired dryers, should be included (UK 2).
<p>New information identified</p> <ul style="list-style-type: none"> • Excel spreadsheet concerning the sugar industry provided by PL. More detail and broader data will be provided by PL during the data collection phase.
<p>EIPPCB assessment</p> <ul style="list-style-type: none"> • In the scope of the review of the LCP BREF, the combustion plants addressed in Article 28 (a) of the IED (plants in which the products of combustion are used for direct heating, drying, or any other treatment of objects or materials) are not covered.
<p>EIPPCB proposal</p> <ul style="list-style-type: none"> • To include in the scope of the FDM BREF combustion processes where the products of combustion are directly used in the production process.

2.1.4 Cooling, freezing and refrigeration and interface with the ICS BREF

Summary of initial positions
<ul style="list-style-type: none"> • Cooling and freezing which is part of the production process should be described in the FDM BREF. Facilities storing meat products should not be included (CLITRAVI 33; ES 9). • The generation of cold should not be covered (DE 4; VDM/MIV 3) but the application of cold should be covered (DE 5). • Freezing should be included where it is relevant for the processes (EEB 4). • Cooling and freezing should be generally excluded from the scope (UK 4; FDE 50). • Cooling and freezing systems are very important in some FDM sectors (e.g. dairy sector); even if excluded from the scope, it could be appropriate to maintain a reference to the techniques to be used and the best way to apply them (IT 2). • Techniques for the use of cold (cooling and freezing) described in the current BREF are only relevant for dairy and beverages. Cooling must be treated according to the demands of each sector, e.g. the meat sector, (ES 66; CLITRAVI 34) and deep freezing of food, cooling of wort and beer, conditioning of maturation rooms (cheese and meat) (DE 5) and include other options of energy-efficient design and operation of cooling systems (PL 26). • Focus on the cooling and refrigeration processes. Take into consideration existing norms and regulations, e.g. CEN Standard 378 no. 1, 2, 3 and 4 and other policies regarding climate change (CLITRAVI 22) and coherent with European legislation on authorised cooling agents (FR 29). • It is important to include prevention of emission of substances that deplete the ozone layer (DE 39). • Reconsider that the existing BREF forbids the use of halogenated refrigerants and therefore goes beyond EU regulations (authorised under EU Regulation CE 842/2006, 517/2014) (ANIA 14; ATLA 3, 31; FDE 45). • Cooling and freezing should be included and should cover all types of refrigerants, unless the ICS BREF will be revised and will include ammonia cooling systems as well (DK 7). • The scope should be restricted on the cooling processes in order to avoid overlap with the ICS BREF (ES 2). • The ICS BREF should be applied to "cooling and freezing", and include in the FDM BREF those aspects that are specific to the FDM sectors (RO 4). • A better interface is needed between the FDM BREF and the ENE and the ICS BREFs to prevent duplications (FR 12). • Issues already addressed in the ICS BREF should be generally excluded (SE 4).
New information identified
<ul style="list-style-type: none"> • Regulation (EC) 842/2006 (being replaced by regulation (EU) 517/2014). • CEN Standard 378 no. 1, 2, 3 and 4.
EIPPCB assessment
<ul style="list-style-type: none"> • The BREF Guidance clarifies that there is no priority among the BAT conclusions of different BREFs, but consistency is sought throughout the BREF series. Where necessary, reference will be made to other BREFs. The scope of the BAT conclusions, following the standard text structure, will contain a table of other relevant BREFs. • The ICS BREF focuses on the cooling systems commonly used within IED activities. • The variety of cooling applications, techniques and operational practices is very wide-ranging and spans many industrial sectors. The ICS BREF provides a review of some available techniques for industrial cooling systems, but in a limited area. • In the current ICS BREF, the term "cooling systems" refers only to systems to remove waste heat from any medium, using heat exchange with water and/or air. The use of

refrigerants such as ammonia and CFCs are not covered. Also, direct contact cooling and barometric condensers are not included.

- Generic aspects of cooling systems covered in the ICS BREF apply also to the FDM sector. The ICS BREF does not cover issues in specific industrial sectors.
- Cooling processes are relevant for the FDM sector and could be important for some FDM sectors (e.g. dairies and breweries).
- Freezing and refrigeration are widely applied in some FDM sectors, for food storage and preservation (e.g. in meat processing, frozen vegetables and precooked meals).
- Cooling, refrigeration and freezing are operations that can be energy-consuming or, for ammonia cooling, they can be related to the storage and handling of liquid ammonia. Water consumption when using water as a cooling medium and the related amount of generated waste water is another environmental issue.
- The reuse of water and hygiene rules on safe storage of food could prevent general techniques for water- and energy-saving measures from being applicable in some FDM sectors. It is expected that the FDM sector will have its own techniques to reduce the environmental impact from operations/processes of cooling, refrigeration and freezing. Descriptions in the current FDM BREF should be updated with new information and related to implemented techniques in the FDM sector.
- The use and handling of refrigerants of high environmental importance are covered in EU Regulation No 517/2014 and Regulation (EC) No 1005/2009 of the European Parliament and of the Council.

Regulation (EC) No 1005/2009 of the European Parliament and of the Council covers the issues for substances that deplete the ozone layer (which could be used as refrigerants).

EU Regulation No 517/2014 of the European Parliament and of the Council covers the issues for fluorinated greenhouse gases (which could be used as refrigerants).

EIPPCB proposal

- To include sector-specific cooling, freezing and refrigeration operations in the scope of the FDM BREF.
- TWG members to collect information on cooling, refrigeration and freezing operations applied in FDM sectors and the related techniques to reduce the environmental impact.
- To avoid duplication of information already covered by the ICS BREF.
- To make a cross-reference to the ICS BREF for general information about industrial cooling systems.
- To avoid duplication of Regulation (EC) No 1005/2009 and Regulation (EU) No 517/2014 of the European Parliament and of the Council and include appropriate cross references in the FDM BREF.

2.1.5 Energy efficiency and interface with the ENE BREF

<p>Summary of initial positions</p> <ul style="list-style-type: none"> • Energy efficiency topics should be generally dealt with by the ENE BREF (AAF 12). • Exclude energy efficiency from the scope, as the ENE BREF covers this issue (VDM/MIV 2). • Energy efficiency requirements should be excluded (FDE 54; FEFAC 2). • Generic aspects of energy efficiency should not be included where already covered by the existing ENE BREF but sector-specific techniques not covered by the ENE BREF should be included (UK 5). • A better interface is needed between the ENE and FDM BREFs to prevent redundancies (FR 12). • Energy efficiency in an important environmental issue and description on implemented energy efficiency measures should be included (SE 8). • Include energy consumption as a key environmental area and a description of measures to increase energy efficiency (AT 1, 3).
<p>New information identified</p> <ul style="list-style-type: none"> • No new information identified at this stage.
<p>EIPPCB assessment</p> <ul style="list-style-type: none"> • Article 13(2) of the IED stipulates that the exchange of information for a BREF review shall, in particular, address the following: <i>(a) the performance of installations and techniques in terms of emissions, expressed as short- and long-term averages, where appropriate, and the associated reference conditions, consumption and nature of raw materials, water consumption, use of energy and generation of waste.</i> • The FDM sector generally has high energy needs. Energy consumption is considered a key environmental issue for the FDM sector and energy efficiency is an important driver for environmental sustainability and improvement. • The ENE BREF contains generic BAT conclusions for all IED installations. • The ENE BREF does not include information specific to production processes and activities in sectors covered by other BREFs and does not define sector-specific BAT. • The BREF Guidance clarifies that there is no priority among the BAT conclusions of different BREFs, but consistency is sought throughout the BREF series. Where necessary, reference will be made to other BREFs. The scope of the BAT conclusions, following the standard text structure, will contain a table of other relevant BREFs.
<p>EIPPCB proposal</p> <ul style="list-style-type: none"> • To avoid duplication of information already covered by the ENE BREF. • To make a cross-reference to the ENE BREF for general information about energy efficiency. • To include energy efficiency in the FDM BREF scope, but to focus on sector-specific issues, which are not covered by the ENE BREF.

2.1.6 Packaging

<p>Summary of initial positions</p> <ul style="list-style-type: none"> • Packing should not be included, as it is regulated under the Packaging and Packaging Waste Directive (94/62/EC), related to shelf life, customer acceptance and marketing and the environmental impact is minimal (CLITRAVI 5, 35). • The scope of the FDM BREF should cover the first packaging of products in consumer-oriented units, if done on site (DE 6). • Packing should not be included as the use of packaging materials is regulated by other legislation and depends on the specific requirements for food safety and product quality (DK 8; FR 11; EDA 3). • Include packaging and extend the focus (EEB 26). Recycling of packaging materials should be a part of the BAT conclusions, e.g. by setting a percentage limit for use of recyclable materials (EEB 32). • Avoid overlap with other Directives or legally binding implications (ES 4). • The BREF should just use the term 'packing' to describe the activity (FDE 52). The activity of 'packing' or 'packaging' should be excluded unless it is a directly associated activity (FDE 51). • Packaging material is a general key environmental issue (EEB 31). • Packing/packaging operations and systems should be kept without BAT conclusions (IT 3; PL 27, UK 9). • There are sectors which use large amounts of packaging, good examples regarding the packing of FDM products may be useful (RO 3). • The activity of 'packing' or 'packaging' should be excluded (UK 9).
<p>New information identified</p> <ul style="list-style-type: none"> • No new information identified at this stage.
<p>EIPPCB assessment</p> <ul style="list-style-type: none"> • For packaging and packaging waste, Directive 94/62/EU sets specific requirements and targets for the recovery and recycling of packaging materials and wastes. • The selection of packaging materials in food industries is strongly dependent on non-environmental criteria, e.g. food safety requirements and marketing issues. • Some packing activities which take place on FDM premises could have an associated environmental impact (e.g. bottle cleaning is also described in the current FDM BREF). Descriptions of currently applied packing processes would be beneficial.
<p>EIPPCB proposal</p> <ul style="list-style-type: none"> • To exclude the selection of packaging materials from the scope of the BAT conclusions. • To include packing activities which take place on the premises of a FDM industry within the FDM BREF scope, but to focus on those with a significant associated environmental impact.

2.1.7 Waste water treatment and discharge

<p>Summary of initial positions</p> <p><u>Direct and indirect discharges</u></p> <ul style="list-style-type: none"> • Scope should be limited to those effluents discharged to receiving waters. 'Indirect' effluents sent to other (chemical installations, municipal, etc.) waste water treatment units shall be excluded (ES 5). Only direct discharges to the environment (water bodies or land) should be covered (PL 18). • Consider all the options for discharging waste water from an installation, not only direct discharges (FR 31, 32; EDA 2). • It should be clarified how indirect discharges to an external treatment plant will be taken into account (SE 2). • Scope should include a description of the interface between FDM BREF and Directive 91/271/EEC (DE 2). <p><u>Interface with the CWW BREF</u></p> <ul style="list-style-type: none"> • Waste water treatment needs to be addressed in the FDM BREF and not in the CWW BREF (AAF 9; ANIA 1; ATLA 23; FDE 38). • If there are chemical activities on a FDM site, take into account the current wording of the scope of the CWW BREF, which considers the "main pollutant load" (FR 3, 4).
<p>New information identified</p> <ul style="list-style-type: none"> • No new information identified at this stage.
<p>EIPPCB assessment</p> <p><u>Direct and indirect discharges</u></p> <ul style="list-style-type: none"> • According to the definitions (Article 3) of the IED: <p><i>'emission' means the direct or indirect release of substances, vibrations, heat or noise from individual or diffuse sources in the installation into air, water or land;</i></p> <ul style="list-style-type: none"> • The exchange of information for the review of the FDM BREF should include data on both direct and indirect discharges of waste water and especially information on the techniques applied to prevent and control pollution to water. • It is complex to assess BAT for indirect discharges, since the quality of the discharge may be conditioned by the downstream off-site waste water treatment plants, which in most cases is an UWWTP. It is however relevant to collect information and performance data on the treatment techniques applied. <p><u>Interface with the CWW BREF</u></p> <ul style="list-style-type: none"> • Chemical activities (also when operated within an installation producing food or feed) would in principle be covered by the CWW BAT conclusions, but not a common WWTP where the main pollutant load originates from activities other than the chemical activity.
<p>EIPPCB proposal</p> <p><u>Direct and indirect discharges</u></p> <ul style="list-style-type: none"> • To include both direct and indirect waste water discharges in the FDM BREF scope.

2.2 KEY ENVIRONMENTAL ISSUES

2.2.1 General environmental issues

Summary of initial positions
<ul style="list-style-type: none"> • Change focus from specific emission treatment to green transition and closing of material loops, e.g. TOC or COD, N and P loops. The external loops for material flows have priority over internal loops meaning that it is OK to have higher energy consumption at the installation if carbon is returned to the loop. (EEB 17, 22, 27, 28, 33). • Do not focus solely on end-of-pipe techniques, but change focus to prevention during processing. This will depend on an efficient data collection (FI 22). • Include BAT and BAT-AEPLs for pretreatment and process-integrated techniques for preventing or reducing emissions to water and air from FDM installations (DE 33). • Food industry works with biomass; carbon is very important for the carbon footprint. The key environmental issue must be the food footprint. The carbon loops must be closed. The company internal carbon loop must be optimized. The external loops which consider the flow when the products have left the installations must be focused on consumption and disposal (EEB 10, 27) • Economic cost assessment of an emission is more important than introduction of an environmental management system (EEB 15). • Go for zero emissions and zero waste approach and create a new section dedicated to this (EEB 20). • The key environmental issues are for the FDM sector as a whole: energy and water consumptions, water emissions (general parameters), air emissions (dust and NO_x from dryers, VOCs for some sectors) and waste emissions (FR 19). • Waste water generation, treatment and discharge are major key environmental issues for most FDM sectors (DK 10). • Good housekeeping and monitoring of the environmental performance is a general issue for all FDM sectors (PL 19, 22). • BAT conclusions should not only be focusing on techniques that can be substantiated by quantitative data. Techniques/recommendations of a more qualitative nature are also important, for instance good housekeeping techniques in relation to waste, cleaning or storage of by-products. BAT conclusion should include qualitative recommendations, which is of great importance for installations with a production of many different and changing products (CLITRAVI 25). • Focus should only be given to parameters that are environmentally relevant (CLITRAVI 27). • Discuss the opportunity to define generic BATs and BAT-AELs to cover sectors that would not be developed in the future FDM BREF. The inclusion or not of sectors could be based on the number of sites (FR 1).
New information identified
<ul style="list-style-type: none"> • Final draft of the CWW BREF (July 2014).
EIPPCB assessment
<u>General positions I</u>
<ul style="list-style-type: none"> • Inclusion of life cycle analysis (LCA) aspect would lead to inconsistency with other BREFs. • Taking material loops into consideration in the determination of BAT would imply the necessity to assess other loops in addition to the internal material loop. • In terms of resource efficiency, the current FDM BREF includes the description of techniques for better use of raw materials including reducing losses of raw materials during processing and therefore the prevention of generation of residues. • Preventing or reducing waste generation is one of the major environmental issues in the

FDM sector and is a subject that should be covered in the chapter on "Techniques to consider in the determination of BAT", see also BREF Guidance Section 2.3.7.

- Including specific references to different loops, such as N, P and C loops, could be relevant for the determination of cross-media effects, even though this would be more evident for the fate and decisions for the reuse, recycling or valorisation of process residues. However, it is outside the scope of the FDM BREF to specify which technique would be best, e.g. to say whether a residue could be used as a fuel, as raw material in anaerobic digestion or as raw material for feed, since this could depend on other national or European priorities. A reference to the waste hierarchy could be included in the description of the techniques and used for identifying techniques to maximise reuse, recycling or valorisation, in order to reduce the material sent to disposal.
- The focus of the FDM sector on better use of raw materials and better further valorisation by adequate processing and planning should not be underestimated. Since the first BREF was drafted, new ways of processing, new products and methods to reduce packaging waste and food waste have been developed and these will contribute to a focus on prevention rather than primarily on end-of-pipe techniques.
- When deciding on the scope and content of the data and information collection, aspects of pretreatment of raw materials and in-process techniques should be included as primary prevention and reduction techniques.

General positions II

- The key environmental issues for the FDM sector as a whole need to be formulated broadly and at the same time recognise that pollutants and key consumption parameters should be defined for the individual FDM sectors.
- The key environmental issues are covered by the main areas: water consumption and emissions, energy consumption, and waste generation, while air emissions are relevant for some sectors. Good environmental practice, housekeeping and monitoring are means to achieve primary prevention and reduction of the mentioned environmental impact areas.
- The sector-specific key environmental issues are better discussed separately, see Section 2.2.7.
- The integrated approach is one of the main concepts of the IED. This integrated approach will be pursued taking into consideration correlations between emissions and consumption and against other parameters such as: sector, product, process, size or capacity of installations and age, while taking into consideration the techniques applied. The techniques include both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned.
- The questionnaire should be built in accordance with the key environmental issues on which the TWG agree during the KoM.
- The data and information collection will support the decisions taken by the TWG during the KoM and be reflected in D1.
- Some sectors may be included in the BREF scope but data collection for other BREFs has often stalled on a very limited number of installations and insufficient data. In such a case, the TWG could decide that the environmental issues for the sector could be better reflected as general conclusions and not as sector-specific conclusions.

EIPPCB proposal

- To strengthen resource efficiency by including documented in-process prevention and reduction techniques as much as possible as candidate BAT.
- TWG to collect information and data to support the development of BAT conclusions in the main areas: water consumption, emissions to water and air, and energy consumption.
- TWG to collect information and data at sector level taking the proposals in Section 2.2.7 into consideration.

2.2.2 Cleaning, hygiene and the use of cleaning chemicals

Summary of initial positions
<ul style="list-style-type: none"> Hygiene standards are critical to ensure product quality and food safety. The reuse of treated waste water should be subject to the prior review of hazards and risks (PT 5) or is already not allowed, e.g. in the dairy sector (ATLA 2). Strong hygiene requirements that apply to the food industry need to be taken into account when defining BAT and BAT-AELs since they influence the performance regarding environmental parameters (FR 42; ANIA 6; ATLA 22; FDE 37) and especially for water usage (FR 42). Cleaning is a key unit operation that is central to all sectors within FDM. It generally has a significant impact on emissions to water, chemical usage, water and energy consumption and the amount of waste (SE 9). The BREF needs to take into account the impact of legislation on the applicability of techniques: e.g. in the milk drying process only cyclones are allowed (by the food safety and hygiene recommendations) for dust abatement (ES 14). Not only chlorine compounds can form disinfection by-products, but also bromine compounds (DE 110). Cleaning of equipment and facilities is important and has an effect on optimisation of materials, energy, water and waste (PL 25). A discussion of the disinfectants and possibilities to reduce their use should be included (DE 67). The use of triclosan should be considered in the review. Triclosan is a bactericide commonly used in hand wash/sanitizers within the Food & Drink sector and is a Specific Pollutant under the Water Framework Directive due to toxicity and suspected endocrine disruption properties (UK 21). Include substitution of EDTA in the review as mentioned in the concluding remarks of the current BREF (SE 9). Avoid prescribing the use of cleaning chemicals (FDE 79).
New information identified
<ul style="list-style-type: none"> Information available in relevant BE (Flemish) BAT studies.
EIPPCB assessment
<ul style="list-style-type: none"> Cleaning is an important horizontal operation, applied to all FDM sectors. It generally has a significant environmental impact, especially in relation to emissions to water. It is expected that developments and improvements have been realised in the FDM sectors since the adoption of the current BREF. Relevant information on implemented cleaning techniques should be collected during the review of the FDM BREF. In the "Recommendations for future work" chapter of the current FDM BREF (Chapter 7.5), it is stated that information should be collected for identification of BAT associated with high-, medium- and low-pressure cleaning. Especially for EDTA, in the "Recommendations for future work" chapter of the current FDM BREF (Chapter 7.5), it is clearly stated that, the possibility of determining BAT to eliminate the use of EDTA could be greatly helped if information about alternative substances already in use was provided and research into other alternatives was undertaken, before this document is reviewed. Food hygiene standards are a priority issue and should not be compromised. The safety of the food products should not be jeopardised through the introduction (e.g. through water reuse) of chemical, microbiological or physical contaminants in amounts that represent a risk to the consumer. A BREF is not the proper medium to question or impose hygiene requirements. The applicability and cross-media effects will be taken into account. The techniques listed and described in BAT conclusions are neither prescriptive nor exhaustive. Other techniques may be used that ensure at least an equivalent level of environmental protection.

EIPPCB proposal

- TWG to collect contextual information about implemented cleaning techniques associated with high-, medium- and low-pressure cleaning, and especially about the usage of alternative, less harmful substitutes instead of EDTA or other risky substances (e.g. triclosan).
- To take into account hygiene requirements when defining BAT.

2.2.3 Water and energy consumption and resource efficiency**Summary of initial positions****General**

- Ratios on energy and water consumption should be included in Chapter 4 but are not relevant as part of the BAT conclusions. BAT conclusions must allow all types of plants to continue their activities despite their complexity and/or national energy policies (ES 92; ANIA 10, 23; ATLA 27; FDE 41).
- Include figures (BAT-AEPLs) for energy consumption and water consumption (AT 10, 11).
- AEPLs for key performance parameters (water usage/energy consumption) should be established where meaningful comparisons can be drawn and should be set with a longer averaging period, e.g. annually (UK 35), and in relevant sectors, e.g. brewing, soft drinks, dairy (UK 38).
- Water consumption or energy ratios need to be very product-specific, if possible, or should be kept at an indicative level. It has to be noted that these highly depend on the single products, qualities and recipes (DE 30).
- Data are only available at plant levels and not at process level or product level; equipment can be used for different products (ES 33; CLITRAVI 61) and especially for dairies (PL 34).
- Define calculation rules for determining specific consumption. The calculation of the different specific consumptions is difficult, e.g. in the dairy sector because milk is often not the only input. It could also depend on the type of milk (cow, goat, sheep) and the presence or not of other activities on the site that contribute to the specific consumptions (FR 36).
- Segregation of outputs, by-products, optimisation of use, reuse or recycling and minimisation of waste water streams are key issues for all FDM industries (PL 20, 21, 22, 23; SE 14).
- It is not necessary to cover resource efficiency in the conclusions or as BAT-AEPLs, since market forces and national legislation determine for example the energy mix, or batch production is too variable, but descriptions would be appropriate (CLITRAVI 8, 23).

Water consumption

- Water usage is an important issue for the sector and BAT need to be confirmed or developed, e.g. on water-saving measures (FR 21).
- Include water consumption because it is a limited resource (EEB 29).
- Use of water can be a relevant environmental issue for some activities; focus on preventive and process-integrated techniques (BE 12).
- Take into account safety requirements for reuse of water before defining BAT. The reuse of water on site for food production, processing or canning faces strong requirements in legislation limiting or preventing it (FR 8, 37; PL 29).
- Annual averaging periods provide a useful indicator of process efficiency (water consumption per unit production) but these BAT-AEPLs should be limited to the priority sectors and not included in the general BAT conclusions for the sector (FDE 78).

Energy consumption

- Specify in the data collection how energy is produced on site and its use even if

combustion installations are covered by the LCP BREF. It will allow a differentiated analysis (FR 46).

- Concerning the energy generation, take into consideration fuels other than natural gas, e.g. production residues. The information should be collected together with relevant emission data (ES 99).

Generation of residues/waste

- Go for zero emissions and zero waste approach concerning both the internal and external loops when the products leave the installations, e.g. by internally reducing the volume of waste water, the organic load concentration will be higher. When the organic load is high enough the waste will be suitable for a digester to produce fertilizer and biogas (EEB 14, 20, 30).
- Establish BAT for minimisation of waste and the conditions for using these residues at the installation or outside and provide emission factors for different types of waste generated (ES-AND 115).
- Technologies that facilitate the further utilisation of co-products (by-products) (i.e. raw material for feed industry, source material for renewable energy) should be described and promoted (DE 21; SE 15; ANIA 45; spiritsEUROPE 7) and as an alternative to effluent treatment (FDE 6; spiritsEUROPE 3).
- The potential use of by-products and therefore also the value of by-products depend on local conditions and markets. The generation of waste and use of by-products are handled in other EU and national regulations concerning waste and are therefore not essential for the BREF (DK 17).
- Waste disposal should be omitted from the BREF (CLITRAVI 4).

Candidate BAT and BAT conclusions for specific sectors

- Water (specific water consumption) and energy usage in beer production should be included (PL 40) and divided between products, e.g. traditional beer and non-alcoholic beer (ES 85).
- Review the benchmark range (AEPL) for water consumption in liquid milk manufacture (UK 36) and develop one for cheese making relating to different products (UK 37) and develop water consumption ranges and waste water volume ranges reflecting the diverse products and multiproduct sites (IE 1, 2).
- A measure of COD in effluent (as kg normalised to product output or, in the case of the dairy sector, per tonne of milk processed) is a useful process efficiency measure. Relevant to brewing, soft drinks and dairy (UK 39).
- Since dairies use different raw materials and produce several dairy products in France, current BAT-AEPLs are not useful since the calculation rules are not defined and cannot be applied easily on these sites (FR 36).
- Review and focus on by-products used for animal feed production from spirit drink production (ANIA 49; FDE 14; spiritsEUROPE 7).
- Collect data and information on environmental performance, applicability and economics for the reuse of heat (heat recovery) in vegetable oil (ES 54) and specifically for the hardening of vegetable oils (DE 113, FEDIOL 16).
- Collect data on energy and water consumption for starch plants (ES 43).

New information identified

- Information on water use available in relevant BE (Flemish) BAT studies.
- UK performance data on water consumption available for a range of new and existing installations.
- AT could provide energy consumption figures at the level of processes and installations.

EIPPCB assessment

General

- The 'performance of installation and techniques' is mentioned in IED Article 13(2) (a) and should also address the issues of water consumption, use of energy and generation of

residues/waste.

- According to the BREF Guidance (Section 5.4), the environmental and operational data needed for the BREF review should include water consumption, use of energy and generation of residues/waste.
- Associated Environmental Performance Levels (AEPL) other than emission levels are foreseen in Section 3.3.2 of the BREF Guidance. These should preferably be expressed in consumption (e.g. energy, water) per unit of product manufactured.
- It is foreseen that in many cases consumption data will be available at plant level but not at unit level.
- Based on the collected data, BAT and possible BAT-AEPLs will be derived or updated during the review of the BREF.

Water consumption

- Food processing is generally a water-intensive operation. Water is used in many steps of food production processes, including food and production equipment cleaning, sanitising, peeling, cooking, and cooling. Water is also used mechanically as a conveyor medium to transport food materials throughout the process. Of course, not all FDM sectors are water users of the same significance.
- Taking into consideration several factors (growing demand for water, increasing water costs, limited access to water in some areas) it is expected that reduction techniques for water consumption are already implemented in the FDM sector, and that new techniques have been developed since the adoption of the current BREF. Water could be reused at least in non-product applications, e.g. bottling plant activities, truck washing, cooling towers, and warehouse floor washing.
- Information about source reduction, reuse and recycling techniques for reduction of water consumption should be collected and possible relevant BAT conclusions could be derived.
- Hygiene issues should be taken into account as a priority issue for the FDM sector. The BREF is not the appropriate basis for defining quality criteria for water recycling and reuse. Generally, the water quality requirements would depend on whether or not contact between water and the food product is possible. Water that comes into contact with the product must generally be of drinking water standard. On the other hand, it is expected that reused process water could be obtained with a quality good enough for non-product applications.

Energy consumption

- The FDM sector has generally high energy consumption levels. Energy efficiency is considered a key environmental issue for the FDM sector and information about implemented energy efficiency techniques is important.
- Information collection includes all types of fuel/energy used in the sector (e.g. fuel oil, natural gas, biomass used as fuel).
- Combustion plants, disregarding their total rated thermal input, will be covered where the products of combustion are used for direct heating, drying, or any other treatment of objects or materials.

Generation of residues/waste

- Implemented techniques and procedures for reduction of waste generation from FDM installations are significant from an environmental point of view and will be described in the FDM BREF.
- The 'Recommendations for future work' (Section 7.5) of the current FDM BREF, includes the need to identify more opportunities for by-product valorisation, to optimise the use of food, drink and milk materials and to minimise waste generation.
- Possible related BAT conclusions will be based on the information provided and its subsequent assessment.
- National waste management policies cannot be assessed in BREFs.

<p>BAT conclusions for specific sectors</p> <ul style="list-style-type: none"> • The sector-specific issues will depend on the assessment of the collected data and information.
<p>EIPPCB proposal</p> <ul style="list-style-type: none"> • TWG to collect data and contextual information on the consumption of water, including reuse and recycling techniques for reduction of water consumption; on energy efficiency techniques and consumption in general and generation of residues/waste with the questionnaire.

2.2.4 General issues for emissions to air and water

2.2.4.1 Emissions to air

<p>Summary of initial positions</p> <ul style="list-style-type: none"> • Collect air emissions data from the different sectors. BAT and BAT-AELs for emissions to air should be sector-specific (DE 22, 41; ES 11, 46; FI 1, 21; FR 30; PL 3; FDE 1). • Collect information on special pollutants in the relevant sections (DE 17). • Focus on major air emission sources in order to define BAT that lead to a pollution reduction (FR 20). • BAT for air emission control should be general for all FDM sectors (PL 31). • Consider emission levels achieved and abatement techniques used in priority sectors, when considering if sector-specific BAT-AEL ranges for air emissions should be developed (UK 17). • The generic BAT-AELs for emissions to air should be reconsidered based on the data collection (BE 4) and the data analysis should help to clarify if generic BAT-AELs are relevant or if sector-specific BATAELs should be preferred (FR 30). • Consider whether it is appropriate to retain two separate ranges for particulates (dry and wet/sticky) or whether one range should be developed (in case a general horizontal BAT-AEL is retained) (UK 18). • Dust should not be a part of the BREF (CLITRAVI 21). • Include for each sector and their combustion plants the following emission parameters - air: dust, NO_x, SO₂ and CO (AT 5).
<p>New information identified</p> <ul style="list-style-type: none"> • VDI guideline 3893. Installations for roasting cocoa and producing cocoa mass.
<p>EIPPCB assessment</p> <ul style="list-style-type: none"> • The identification of environmental issues is a key step of the review. • The current FDM BREF presents very little performance data on air emissions from different sources. As mentioned elsewhere in this BP, the relationship between the source and the emission reduction derived from the applied technique (in-process and end-of-pipe) is part of the contextual information necessary to perform a valid assessment of emissions data. • Unit operations and the related emissions and key parameters are sector-specific although some unit operations such as dry raw material preparation often yield dust emissions and apply similar filter techniques. • Based on the data assessment, some BAT might be commonly applicable with generally attainable performance levels which could be better included in a general BAT conclusion. • The characterisation of dust and the related applicability of techniques and performance levels should be clarified in the review and the relevant information gathered within the relevant sectors.

- Sector-specific issues for emissions to air and the related data and information collection are further discussed in following sections (2.2.7.2 - 2.2.7.13).

EIPPCB proposal

- TWG to collect information on applied techniques (in-process and end-of-pipe techniques) for reducing emissions to air of key pollutants and to give priority to prevention.
- TWG to collect sector-specific data and information on emissions to air following the identification of specific parameters in Sections 2.2.7.2 - 2.2.7.13.

2.2.4.2 Emissions to water

Summary of initial positions

- The waste water treatment is not linked to specific unit operations since the majority of the activities on site contribute generally to waste water effluents. Adopt principles from the CWW BREF (FR 34).
- Focus on sector-specific in-process waste water minimising techniques (EEB 23).
- A double waste water treatment requirement is unsuitable if waste water is discharged to a separately operated waste water treatment plant (FI 10).
- BAT-AELs for waste water should be set prior to waste water treatment plant. Placing the BAT-AEL after the last step of waste water treatment does not follow the EU principle of preventive action at the source. In addition it would go against the BAT principle itself which states that you should use the best available technique in the production (CLITRAVI 3; DK 10).
- Include washing of trucks (EEB 2). Include washing and reuse of packaging materials like glass bottles in breweries (EEB 1). Discharges of wash water from cleaning the outsides of vehicles is an issue that needs to be covered (SE 10).
- Take final destination for discharged water into account, e.g. UWWTP, when collecting data for setting BAT-AELs and the emission level should be on installation level, not process level (CLITRAVI 15).
- BAT for waste water treatment should be general for all FDM sectors (PL 32).
- Relate BAT-AELs to possible off/on-site re-use of certain waste water streams (SE 15).
- Each industrial site should be free to choose the waste water treatment processes that are the most relevant to the specific installation, which can be either internal or external (e.g. connection with an off-site WWTP, lagooning) (AAF 10; ANIA 7; ATLA 24; CEFS 6; DE 55; FDE 4, 39; FI 4; ES 95; PL 36; SNFS 5). Also, multiple forms of treatment may be deployed on a single site (IE 8).
- Remove the achievable levels for waste water that are mentioned in the current BREF. These should not be regarded as mandatory since a whole range of techniques can be used in the abatement depending on the requirements (EDA 32).

New information identified

- Final draft of the CWW BREF (July 2014).

EIPPCB assessment

- BAT conclusions for reduction of emissions to water could include in-process, pretreatment and final treatment techniques applied in the FDM installations. The exchange of information will be the driving force for BAT identification.
- Additional on-site activities contributing to waste water generation and pollutant load will be taken into account as far as possible, especially when assessing the data. The questionnaire for data collection should also include the possibility to include other parameters and indicate and characterise the tributary waste water streams.
- The emission limit values for the polluting substances apply at the point where the emissions leave the installation, as per IED Article 15(1).

- BAT-AELs will contain a numerical range of emission levels that should reflect the different performances of the techniques and the variability within the best operation of the techniques.
- Environmental performance levels other than emission levels could be associated with certain BAT.
- Potential BAT-AE(P)Ls will be proposed after assessing all the available data and where there is a sound basis for doing so.
- BAT conclusions shall be the reference for authorities when setting permit conditions. In particular, the emission limit values in the permits have to ensure that the emission levels as defined in the BAT conclusions are not exceeded.
- The techniques that will be listed and described in the BAT conclusions are neither prescriptive nor exhaustive. Other techniques may be used that ensure at least an equivalent level of environmental protection to the one defined in the BAT conclusions.
- Both direct and indirect waste water discharges should be considered (see relevant Section 2.1.7) and relevant data and information should be collected. It is expected that a differentiation will occur concerning potential BAT-AELs or BAT-AEPLs, according to the type of discharge.
- The choice between direct or indirect waste water discharges depends on several factors (e.g. proximity and capacity of off-site WWTP, proximity and characteristics of potential receiving waters) and could be regarded as an installation-specific issue.

EIPPCB proposal

- To take into account all relevant techniques (in-process and end-of-pipe techniques) applied in the FDM installations for reducing the environmental impact of waste water discharges and to give priority to prevention.
- TWG to collect data for both direct and indirect waste water discharges and applied in-process techniques.
- To take into account as far as possible additional on-site activities contributing to waste water generation.
- TWG members to provide information relevant to the above bullets.
- To clearly mention in the BAT conclusions that the listed techniques are neither prescriptive nor exhaustive and that other techniques may be used which ensure at least an equivalent level of environmental protection.
- To not assess the issue of selection between direct or indirect waste water discharge.

2.2.5 Monitoring and averaging periods

Summary of initial positions

General

- Define the point of measurement to ensure representativeness (ES-AND 112).
- Include monitoring and measuring methods in the BAT conclusions (BE 5, 6; ES 49, ES-AND 111; UK 2; CLITRAVI 24) and define all pollutants and give references to standards (DE 16; ES 45; RO 13; AAF 6; ANIA; ATLA 19; FDE 35, 93).
- Include and specify necessary standard reference conditions for emissions to air and water and, if necessary, the details and averaging periods (BE 4, 10; ES-AND 111, UK 24, 25).
- Define reference conditions for emissions to air for non-combustion sources as 101 kPa, 273 K, with no correction for water vapour or oxygen (UK 29).
- Continuous measurement should be defined as daily average (FEFAC 9).
- Periodic monitoring for air emissions should be based on 3 samples each of 30 minutes duration minimum (UK 26; FDE 74; FEFAC 8).
- Define averaging periods for water monitoring, e.g. hourly or daily averages for continuous monitoring and 24-hour flow-proportional composite sample for periodic (UK 28).
- Averaging period for continuous monitoring for air emissions should be based on daily

average (using valid hourly averages) (UK 27; FDE 75).

- Monitoring of waste water; use continuous monitoring or at least samplers with a minimum requirement for the number of subsamples for a 24-hour sample (EEB 9).

Averaging periods

- Define BAT-AELs based on annual values (ANIA 25; ATLA 17).
- Short-term average values firstly, (AT 8; DE 28) and secondly also yearly averages, are desirable (BE 4) but take seasonality into account at the same time (FDE 77).
- Long-term averages should be used in BAT-AELs especially in waste water treatment when seasonally operated short-term averages are not suitable due to long-lasting start-ups from a cold shutdown (FI 19).

New information identified

- The JRC Reference Report on Monitoring for IED installations (ROM on-going review).
- Relevant BAT studies from BE.
- Data on parameters monitored by the food industry in FR and measurement methods can be submitted.

EIPPCB assessment

General

- With reference to the IED, the emission levels associated with the best available technique (the BAT-AELs) are typically ranges expressed as an average over a given period of time, under specified reference conditions.
- Also, according to the BREF Guidance (Section 3.3.1) regarding BAT-AELs, the associated reference conditions and the averaging period need to be unambiguously defined.
- The data assessment will take the monitoring used into account. Information on the use of EN/ISO or (other) monitoring standards will be part of the information requested.
- BAT conclusions on monitoring will be developed to propose a consistent way of monitoring that in the long term is expected to lead to a harmonised monitoring and averaging practice in the FDM sectors.
- Clear and unambiguous definitions will be used, e.g. the points of measurement, the monitoring and measuring methods will be explicitly described and defined, in accordance with recently adopted BREFs and the ROM. As an example, a recommendation given in the ROM and repeated in recent BAT conclusions is that periodic monitoring of waste water should preferably be based on 24-hour flow-proportional composite sampling.
- BREFs and their BAT conclusions should provide information on the monitoring methods and standards. The monitoring principles and standard methods for sampling and analysing are described in the ROM. For the BAT conclusions adopted under the IED, it is a common practice to include specific “monitoring” conclusions on BAT for monitoring.

Averaging periods

- According to the BREF Guidance (Section 5.4.7.3), *the exchange of information should address the performance of plants/installations and techniques in terms of emissions expressed both as short- and long-term averages, where appropriate.*
- Generally, it is expected that short-term averages are widely used assessing environmental compliance.
- Yearly averages give a good picture of the environmental performance related to a process/technique, independently of any variations or disturbances.
- The derivation of short- or long- term BAT-AELs depends on the availability of data.
- From the information received with the initial positions and as generally expected, monitoring and averaging are not applied homogeneously throughout the EU. In order to deal with this situation, submitted data need to be accompanied with the necessary information.
- It is expected that sampling for the most common parameters typically is performed as a

24 hour composite sampling, which could be a basis for a daily average. Data on yearly averages could equally be collected but it is essential that this long term average is explained in terms of which individual data this average represents.

EIPPCB proposal

General

- To include specific BAT conclusions on monitoring.

Averaging periods

- TWG to collect data with short-term averages (e.g. min/max values over one year of daily averages) and long-term averages (e.g. min/max values over one year of monthly averages), for each parameter monitored continuously.
- TWG to collect all the data over one year for each parameter monitored discontinuously.
- To consider the possibility of deriving short-term BAT-AELs the priority, taking into account the availability of data and special circumstances (e.g. seasonal operations).

2.2.6 Expression of BAT-AEL and BAT-AEPL

Summary of initial positions

Differentiation of BAT-AELs/BAT-AEPLs according to various factors

- BAT-AELs should be set as ranges depending on raw materials or products, etc. (DE 52; AAF 14; FDE 31, 72, 94; FEFAC 7).
- The BAT-AEL must be determined in intervals to reflect the variation due for instance to seasonal differences, fluctuations in daily/weekly production and technology performance (FI 16; CLITRAVI 45; FDE 36; FI 16).
- The horizontal emission values in Table 5.1 for waste water discharge should be replaced by sector-specific values (ES 22; FI 2, 18).
- Develop sector-specific BAT-AEPLs and BAT-AELs instead of the existing general conclusion summarised in Table 5.1 (FR 33; IT 16).
- BAT-AELs for waste water should be defined separately for each FDM sector (ES 22, 46, FI 1, 2, 18, 21; DE 22, 42; PL 3, 12; SE 12; ANIA 9; ATLA 26; CEFS 4; FDE 1, 3, 67; SNFS 4, UNGDA 3).
- BAT-AELs should not focus on the level of unit operations but on sector level (CLITRAVI 39).
- Regarding emissions to water, determine if a common suitable range can be established or whether a sector-based approach is required. Consistent with approach taken in the Common Waste water Treatment BREF (UK 31).
- Distinguish between sectors/seasonal activities/processes in BAT conclusions and BAT-AELs/BAT-AEPLs (BE 3; SE 12; CLITRAVI 27; FDE 61), especially for sugar plants (DE 22; ES 46; FI 1; CEFS 2; FDE 1).
- Distinguish between new and existing plants in BAT conclusions and in the description of applicability of the technique (BE 3; DE 44; ES 47, 87; FI 16; SE 12; AAF 2; ANIA 21; ATLA 1; CLITRAVI 57, 58; FDE 16; FEDIOL 2).
- Distinguish and take into account production capacities in BAT conclusions (ES 93; AAF 13; ANIA 5, 11; ATLA 21, 28; FDE 36, 42).
- The BAT-AEL range should cover the use of different raw materials and their variability in terms of induced emissions/equipment needed (ES 94).
- Possibly differentiate BAT-AELs for COD and N between sectors and in relation to applied techniques (ES 25).

Concentrations vs specific loads

- Use specific loads (kg/produced unit or raw material input) (EEB 7).
- In general, present short-term average values as concentration levels (e.g. mg/l, mg/Nm³) (AT 9).

- Focus on both concentrations and mass flow of substances (SE doc 3).
- Do not always use (by default) the concentration term to express or debate the AELs. Decide case by case in order not to penalise those installations or regions where water reuse projects have been implemented. This can be captured through the questionnaire (ES 97).
- A measure of COD in effluent kg normalised to product output (or in the case of the dairy sector per tonne milk processed) is a useful process efficiency measure. Relevant to brewing, soft drinks and dairy (UK 39).
- In the case of water effluent from industrial tomato production (fruit & vegetables) use concentration to express the emission values, since this is the norm in permits in this sector (ES 98).
- Express BAT conclusions in overall performance values, i.e. x mg of pollutant load / output of product, input of raw materials or other performance benchmarks, e.g. use waste per produced unit or input of raw materials for measuring prevention. If water consumption/ emissions are the main environmental issue, the overall impact on the water (chemical and ecological status) should be used for benchmarking. This approach is in line with Art. 1 of the IED and Annex III (LCA approach) (EEB 6, 7).

New information identified

- Article: Methodology for determining emission levels associated with the best available techniques for industrial waste water; Journal of Cleaner Production, Volumes 29–30, July 2012, pages 113-121.

EIPPCB assessment

Differentiation of BAT-AELs/BAT-AEPLs according to various factors

- According to the BREF Guidance (Section 3.3.1), *an individual BAT conclusion with BAT-associated emission levels (BAT-AELs) will contain a numerical range of emission levels.*
- The integrated approach is a main aim of the IED. This integrated approach will be pursued by checking correlations between emissions and consumption (the key environmental issues decided at the KoM) and will consider other parameters such as: process, size of installations, age (to distinguish new/existing plant), type of raw materials.
- Possible differentiation of BAT-AELs/BAT-AEPLs according to various factors (e.g. new or existing plant, raw material used) will be based on the outcome of the data assessment following the previously described integrated approach.

Concentrations vs specific loads

- According to the BREF Guidance (Section 3.3.1), BAT-AELs can be expressed both as concentrations and/or specific loads (mass of pollutant released per unit of product manufactured or unit of raw material used).
- For the expression of the BAT-AELs, the nature of the available data and the applied ELVs in the different MS will be important factors. It is expected (as also illustrated in the relevant initial information provided) that concentrations are widely applied.
- On the other hand, specific loads (quantity of pollutant per unit of raw material used/unit of product produced) could be a better indicator of the performance of installations and techniques applied, e.g. when pollutant concentrations are increased as a result of measures to reduce effluent volumes.
- Concentrations of pollutants in waste water can be coupled with waste water discharge flows. Similarly, concentrations of pollutants emitted to air can be coupled with waste gas flows. Pragmatically, it gives similar information such as specific load by using data that are more frequently monitored and more comparable.

EIPPCB proposal

- To consider relevant factors in the integrated assessment, e.g. the type of process, size of installation/new or existing plant and type of raw materials.

- To primarily consider the expression of BAT-AELs in concentrations, coupled with waste water discharge flow or total waste gas volume, and further express BAT-AELs also as specific loads, when feasible.

2.2.7 FDM sectors and their key environmental issues

2.2.7.1 Key pollutants for emissions to water

Summary of initial positions
<ul style="list-style-type: none"> • COD is an indicator parameter relevant for all sectors (BE 9; UK 33; ANIA 12; ATLA 29; FDE 43) • For all sectors the volume, COD, solids, tot-N, tot-P, T, pH, BOD, fat/grease are relevant parameters (AT 4). • The parameters listed in Table 5.1 in the current BREF are considered to be appropriate and sufficient for effluent emissions direct to a water course (UK 30; FDE 85) and only for end discharge (FI 13). • Do not include additional BAT-AEL parameters in Table 5.1 and all parameters might not apply to all sectors (FDE 85). • Retain BOD as an AEL, since it is a relevant parameter for direct discharges (UK 32). • Relationship between TOC and COD is unique for the waste water stream and it is not possible to have a universal TOC/COD ratio (CLITRAVI 12). • TOC and COD relationship should be investigated before TOC can replace COD (FDE 86). • Collect data on both TOC and COD in order to not exclude one or the other beforehand (FR 23). • Include TOC to gather data when available (DE 20) and TOC could be a future alternative (SE doc 3). • Do not include oil and grease, which is quantified already by COD; a ratio can be determined (ANIA 12; ATLA 14, 29; FDE 43). • Oil and grease might not be relevant for all sectors (FR 22). • A requirement of oil and grease and pH value parameters for discharge of waste water is unsuitable if waste water is discharged to a separately operated waste water treatment plant (FI 11). • Total hydrocarbon (THC) is not necessary if monitoring for oil and grease (FDE 84). • Collect data and contextual information regarding N and P (UK 34). • Collect data on both TN and inorganic N in order to not exclude one or the other beforehand (FR 24). • Include additional sector-specific waste water parameters and special pollutants if relevant, e.g. metals, Cl and others (AT 4; DE 18); include Zn, Ni for all sectors and chloroform for those using animal raw materials (including milk) (FR 18). • Chlorides are relevant for some processes or sectors (DK 11), especially when water is reused or softened with RO; include chloride as a parameter when relevant (BE 7). • AOX could be relevant in relation to cleaning (BE 8; ES-AND 109). • Conductivity is a key parameter in relation to cleaning (ES-AND 108). • Include Nitrate, Ammonia and Phosphate. Also, the impact of sulphate/chloride as part of the phosphorus reduction measures and softening should be considered (IE 4). • Do not set a BAT-AEL for toxicity (ES 55; CLITRAVI 14). • Do not set a BAT-AEL for BOD (ES 56). • Do not set a BAT-AEL for NH₄-N (water) (ES 57).
New information identified
<ul style="list-style-type: none"> • ANIA: Data on COD emissions are available. • Flemish study concerning AOX is in progress.

- French nationwide monitoring programme of relevant micro-pollutants related to priority substances in releases to surface water to be provided.

EIPPCB assessment

General parameters

- For waste water, the selection of parameters and the monitoring frequency reported by Member States reflect to a certain extent whether the discharge is to an off-site waste water treatment plant, e.g. an urban waste water treatment plant, or direct to a water body.
- However, the main parameter which is used is COD in all sectors and with the highest monitoring frequency. There are only a few indications of specific parameters related to one process or sector and the common waste water parameters, besides COD, generally include BOD, TSS, TN, NH₄-N and TP.
- Generally, COD, TSS, TN, and TP are considered appropriate and minimum sufficient parameters for the characterisation of the majority of industrial waste waters, including those from FDM activities.
- There could be additional sector-specific parameters, e.g. oils and fats, heavy metals. This will be evaluated for the individual sectors, see Section 2.2.7.

Total Organic Carbon (TOC)

- Standard methods for COD analysis imply the use of very toxic compounds (i.e. chromium (VI) and mercury) and alternatives to COD should be found.
- TOC could be as alternative parameter to COD and this has been recognised in recent BREF reviews (e.g. CAK, CWW).
- Generally, the COD/TOC ratio is site-specific. Not only does it depend on the performance of the pretreatment and final treatment, but also on the activities carried out at the site which determine the organic loads in the raw waste water. Based on the assessment of collected data, it should be considered whether a general ratio could be derived.

Biochemical Oxygen Demand (BOD)

- Biodegradable compounds covered by BOD are a subset of all organic matter present in the waste water. BOD is therefore included in the parameter COD/TOC.
- COD is a quicker test that also provides an indication of the operation of a WWTP. Additionally, a correlation between the COD and BOD usually exists for a specific installation. Indication of achievable BOD levels could be beneficial.
- The measurement uncertainty for BOD is higher than for COD/TOC and the monitoring result is only available several days after sampling.
- Low emission values of organic substances could be ensured without using BOD for setting permit conditions.

Ammonium nitrogen (NH₄-N)

- Ammonium nitrogen is covered by the parameter total nitrogen. Total nitrogen (TN) is a more pertinent parameter as all forms of organic and inorganic nitrogen can contribute to eutrophication.
- Ammonium nitrogen is often measured in discharge waste waters, mainly as an indicator regarding the efficiency and effectiveness of a waste water treatment plant.
- Ammonium nitrogen is toxic in its NH₃ form. The pKa value of ammonium (NH₄⁺) is 9.25. This means that at pH 9.25, 50 % of the ammonium nitrogen is in the form of ammonia (NH₃) and at pH 7.25 it is ~1 %, therefore the toxicity of waste water strongly depends on the local conditions (i.e. the pH value of the receiving water).

Toxicity

- Toxicity tests allow for an integrated assessment of the properties of a waste water sample (including synergistic/antagonistic effects) that cannot be achieved by analysing single substances or other general chemical parameters.
- Approximately ten toxicity tests are available as EN standards and toxicity assessment

- could be regarded as a very valuable tool for identifying and resolving local impact issues.
- It is not expected that a variety of hazardous substances are handled in the FDM industry.

EIPPCB proposal

All of the following proposals are referred to at the general, horizontal level. Any differentiation related to sector-specific key issues is proposed in the relevant sections.

General parameters

- To collect data with the intention of proposing BAT-AELs regarding COD, TSS, TN, TP, while taking into consideration the individual sector.

Total Organic Carbon (TOC)

- To collect data for TOC in order to propose a relevant BAT-AEL as an alternative to that of COD.

Biochemical Oxygen Demand (BOD)

- To collect data for BOD, but not propose a BAT-AEL for this parameter.

Ammonium nitrogen

- To collect data for ammonium nitrogen, but not propose a BAT-AEL in those cases when BAT-AELs for TN will be proposed.

Toxicity

- Do not set BAT-AELs for toxicity and do not ask for relevant information.

2.2.7.2 Meat processing**Summary of initial positions**

- Emission of COD, N, P and pH to water is the primary environmental impact and depends on the recipient of the waste water (ES 35; CLITRAVI 10). Oil and grease is covered by COD and is a process control parameter only (ES 36) and it is a problem measuring animal fat (CLITRAVI 11). Salts (NaCl and Na₂SO₄) are not an issue for the WWTP (ES 37; CLITRAVI 13).
- COD, BOD, TSS, TN, NH₄-N, TP, oil and grease could all be important parameters for waste water (BE, DE, FR, SE, PL - doc 3).
- Relationship between TOC and COD is unique for the waste water stream and it is not possible to have a universal TOC/COD ratio (CLITRAVI 12).
- Waste water from cleaning smoke ovens or liquid smoke containers is not a key issue, since quantities are low (ES 28; CLITRAVI 18).
- Collect data on COD, N and P emissions to water and pH (ES 35).
- Collect data on yearly quantity of generated waste water for smoking (ES 28).
- The monitoring frequency for waste water discharges reported applied varies from daily to half yearly depending on MS, installation, discharge and includes COD, BOD, TSS, TN, NH₄-N, TO and oil and grease. 24-hour composite sampling is generally used (BE, DE, FR, SE, PL, doc 3).
- Emissions to air are not specific to meat processing processes, but related to energy production. Emissions to air should not be a key environmental issue (ES 38, 81; CLITRAVI 16).
- Smoking can cause odour and is treated as such, this is not an issue (CLITRAVI 14). Odour could be related to smoking, frying, cooking boiling and roasting (BE, DE, DK, PL, and SE - doc 3).
- When using thermal oxidation, NO_x and CO are relevant parameters (DE – doc 3).
- Collect data for smoking processes and abatement techniques applied for smoking (ES 65; CLITRAVI 19).

New information identified
<ul style="list-style-type: none"> BAT studies concerning (1) dairy, (2) drinks (malt, beer, non-alcoholic drinks, alcoholic drinks, wine), (3) fruit and vegetables, (4) meat and fish (in Dutch) (BE 4).
EIPPCB assessment
<ul style="list-style-type: none"> Meat processing includes a wide range of fresh, marinated, cured, smoked and canned meat products. Water and energy consumption and generation of residues/solid waste are relevant issues. Waste water generation, treatment and discharge should be considered a major issue for the sector. The main source of waste water is from equipment cleaning and additionally from some unit operations such as cooking, cooling and can washing. If TOC is monitored, data should be provided. COD should be considered a relevant parameter and, if available, also TN and TP. The parameters BOD, TSS, NH₄-N and oil and grease are also often monitored and are valuable in order to assess the character of the waste water and the efficiency of the applied treatment techniques. The product range could change considerably during the year and it is important to be able to relate variations in COD load for example to the product. Collection of additional data in specific loads for COD should be considered (kg/tonne of raw material/produced unit) since there will be a relationship between water consumption for cleaning and COD load. Oil and grease is a relevant parameter in the meat processing sector, but should already be covered by COD. Oil and grease could be more relevant as an internal operating control parameter. Removal efficiency of oil and grease using internal pretreatment should be documented if data are available. Air emissions from meat processing installations mainly derive from energy production, which is proposed not to be covered in the FDM BREF, and to smoking kilns. The existing BREF covers smoking of meat products, but there is a general lack of information and data. The smoking of meat products generates complex odorous emissions characterised and controlled by odour monitoring and/or by stack monitoring of TVOC. Air emissions data from smoking processes on TVOC should be collected and could be supplied with some indications of odour levels. NO_x and CO generation when applying thermal oxidation should be taken into account. Other data related to smoking could be collected such as generated waste water. Frying, roasting, cooking and boiling could be included as relevant emission sources to air, but there is less background to include these and they are not considered a major emission source.
EIPPCB proposal
<ul style="list-style-type: none"> TWG to collect water emissions data for TOC, COD, BOD, TSS, TN, NH₄-N, TP and oil and grease in concentrations (mg/l), together with either the related waste water flow (m³/time unit) or the related load (mg/time unit). TWG to collect data on specific loads for TOC and COD (kg/unit of finished product). TWG to collect contextual information on the applied waste water treatment techniques, cleaning processes and product range variation. TWG to collect data on TVOC emissions to air (mg/m³) from smoke kilns supplied with data on loads (mg/time unit). TWG to collect contextual information on the smoking process, odour levels, generated waste water and applied waste gas treatment techniques including related emissions of NO_x and CO if relevant. Not collect further data on emissions to air from meat processing, except information when related to odour.

2.2.7.3 Fish and shellfish processing

Summary of initial positions
<ul style="list-style-type: none"> • COD, BOD, TN, NH₄-N and sometimes TOC and TSS are important for waste water (BE, DE, SE doc 3). • TOC is related to smoking and frying (DE – doc 3), NO_x and CO relevant when using thermal oxidation (BE, DE – doc 3). • Odour can be relevant for smoking, frying and storage of fish waste (BE, DE, DK, SE, UK – doc 3).
New information identified
<ul style="list-style-type: none"> • BAT studies concerning (1) dairy, (2) drinks (malt, beer, non-alcoholic drinks, alcoholic drinks, wine), (3) fruit and vegetables, (4) meat and fish (in Dutch) (BE 4). • BAT and cleaner technology in Fish processing industry, 2009. Nordic Council.
EIPPCB assessment
<ul style="list-style-type: none"> • Fish and shellfish processing includes production of fresh and , frozen retail product, canned fish/shellfish, marinated fish, smoked fish and frozen ready meals. • Water consumption and energy consumption are high. • Odour and handling of fish residues/solid waste are relevant issues. • Waste water generation, treatment and discharge should be considered a major issue for the sector. The main source of waste water is from equipment cleaning, transportation, thawing, cooking and can washing. • COD, TN and TP and, if available, also BOD, TSS and NH₄-N should be considered the relevant parameters. • Collection of additional data in specific loads for COD should be considered (kg/unit of finished product), since there will be a relationship between water consumption for cleaning and COD load. • If TOC is monitored, data should be included. • Removal efficiency of oil and grease using internal pretreatment should be documented if data are available. • Air emissions from fish and shellfish processing installations are registered in relation to energy production, which is proposed not to be covered in the FDM BREF, and sometimes to smoking kilns. • The existing BREF covers smoking in general but there is a general lack of information and data on the smoking of fish products. • Odour is often a major issue in a fish processing plant. It is strongly related to the storage of fish waste and the generation of odorous amine compounds resulting in diffuse emission of odour.
EIPPCB proposal
<ul style="list-style-type: none"> • TWG to collect waste water emissions data for TOC, COD, BOD, TSS, TN and NH₄-N in concentrations (mg/l), together with either the related waste water flow (m³/time unit) or the related load (mg/time unit). • TWG to collect data on specific loads for TOC and COD (kg/unit of finished product). • TWG to collect contextual information on the applied waste water treatment techniques, cleaning processes and product range variation. • TWG to collect additional information on smoking processes and emission data on TVOC emissions to air (mg/m³) from smoke kilns supplied with data on loads (mg/time unit) if available. • TWG to collect information on techniques for storage and handling of fish by-product and reductions of odour emissions

2.2.7.4 Fruit and vegetables

<p>Summary of initial positions</p> <ul style="list-style-type: none"> • For fruit juice bottling, COD, BOD, TSS, TN and TP are important in water emissions (FR - doc 3). • For canned fruit and vegetables, the consumption and generation of waste water from washing, blanching and sterilisation are relevant and COD and BOD should be controlled (FR - doc 3). • Dust in air emissions could be relevant for drying operations (SE – doc 3) • Odour could be relevant (BE, DE, DK, SE – doc 3)
<p>New information identified</p> <ul style="list-style-type: none"> • Flemish BAT studies concerning (1) dairy, (2) drinks (malt, beer, non-alcoholic drinks, alcoholic drinks, wine), (3) fruit and vegetables, (4) meat and fish (in Dutch) (BE 4)
<p>EIPPCB assessment</p> <ul style="list-style-type: none"> • The fruit and vegetables industry includes a very wide range of products including canned fruit and vegetables in water, syrups or marinades, frozen blanched products, frozen ready meals, juices, nectars and concentrates. • Water and energy consumption and residues/solid waste are relevant issues. The handling, further processing and production of innovative products from production residues/perished raw material or for use in anaerobic digestion could constitute important contributions towards resource efficiency. This should be mentioned in the BREF. • Waste water generation, treatment and discharge should be considered an issue for the sector. The main source of waste water is from equipment cleaning and additionally from some unit operations such as washing, cooking, cooling and can washing. • COD, TSS, TN and TP should be considered the key parameters. • The parameters BOD and NH₄-N are also often monitored and are valuable in order to assess the character and the efficiency of the applied water treatment techniques. • The product range could change considerably during the year for some installations or have a strict seasonal production and it is important to be able to relate variations in COD load for example to the products. • Collection of additional data in specific loads for COD and TSS should be considered (kg/unit of finished product) since there will be a relationship between water consumption for cleaning and COD load. • If TOC is monitored, data should be provided. • Air emissions are registered in relation to energy production, which is proposed not to be covered in the FDM BREF. • Other specific sources to emission to air that could constitute a general environmental issue have not been identified so far. • Odour emissions could be related to storage of raw materials and perishable raw materials and this could be developed further in the BREF.
<p>EIPPCB proposal</p> <ul style="list-style-type: none"> • TWG to collect waste water emissions data for TOC, COD, BOD, TSS, TN, NH₄-N and TP in concentrations (mg/l), together with either the related waste water flow (m³/time unit) or the related load (mg/time unit). • TWG to collect data on specific loads for TOC and COD and TSS (kg/unit of finished product). • TWG to collect contextual information on the applied waste water treatment techniques, cleaning processes and product range variation/seasonality. • TWG to collect potential air emissions data (not related to energy production).

- TWG to collect information on odour sources and related techniques for odour reduction.
- TWG to collect information on value-added production from production residues and treatment alternatives.

2.2.7.5 Dairy sector

Summary of initial positions
<ul style="list-style-type: none"> • Revise water consumption and waste water generation levels by collecting new data and according to relevant milk product processes (IE 8; UK 38; EDA 33) and not product categories (ES 7). • A measure of COD in effluent kg normalised to product output (or in the case of the dairy sector per tonne milk processed) is a useful process efficiency measure (UK 39). P is a less relevant water parameter for the dairy sector (VDM/MIV 5). • Dust emissions in relation to drying in the dairy sector is relevant, e.g. for whey protein, lactose and milk powder, and should be revised (DE 104; IE 6; UK 17, 40; ANIA 35; ATLA 11; EDA 40). • Define specific emission levels for butter production (PT 1). • Define specific emission levels for yogurt production (PT 2). • Define specific emission levels for cheese production (PT 1). • Air emissions are not relevant for the dairy sector (BE, DE, DK, SE – doc 3), except for dust from drying of milk powder and whey powder (DE, DK, FR, SE, UK – doc 3)
New information identified
<ul style="list-style-type: none"> • BE (Flemish) BAT studies concerning (1) dairy, (2) drinks (malt, beer, non-alcoholic drinks, alcoholic drinks, wine), (3) fruit and vegetables, (4) meat and fish (in Dutch) (BE 4). • BAT guidance note for dairy sector, IE 2008.
EIPPCB assessment
<ul style="list-style-type: none"> • The dairy sector comprises products based on milk as the main raw material, including milk, yogurt, butter, cheese and milk powder. Additional products such as whey powder and convenience food are also included. • Water consumption and energy consumption are high. • Waste water generation, treatment and discharge should be considered a major issue for the sector. The main source of waste water is from equipment cleaning and some liquid by-products. • COD, TN, NH₄-N and TP should be considered the relevant parameters and, if available, also BOD, TSS, Cl⁻ and oil and grease. • Collection of additional data in specific loads for COD should be considered (kg/unit of finished product), since there will be a relationship between water consumption for cleaning and COD load. • If TOC is monitored, data should be provided. • Air emissions from dairies are registered in relation to energy production, which is proposed not to be covered in the FDM BREF. • Dust emissions to air from drying in the production of e.g. milk powder and whey powder should be considered and data collected which also covers an characterisation of the dust fraction.
EIPPCB proposal
<ul style="list-style-type: none"> • TWG to collect waste water emissions data for TOC, COD, BOD, TSS, Cl⁻, TN, NH₄-N and TP in concentrations (mg/l), together with either the related waste water flow (m³/time unit) or the related load (mg/time unit). • TWG to collect data on specific loads for TOC and COD (kg/unit of finished product) if

possible.

- TWG to collect contextual information on the applied waste water treatment techniques, cleaning processes and product range.
- TWG to collect data on water consumption and waste water generation with the necessary contextual information on products produced.
- TWG to collect data on dust emissions to air from drying operations in e.g. milk and whey powder production including characterisation of the dust fraction, information on drying technology and applied filter systems.

2.2.7.6 Oilseed processing

Summary of initial positions

Oilseed processing

- Energy consumption and VOC emissions are key environmental issues (DE 19; ES 19; FR 27; UK 42; ANIA 38; FEDIOL 30) and wet dust (air - mg/Nm³) (ANIA 39).
- Dust is an issue for seed storage and handling, screening, flaking, conditioning and drying (UK doc 3).
- Selection of the most appropriate refining technology should be based on collected data on specific energy and water use and pollution load before treatment (DE 49; ES 61; FR 35; ANIA 41; FEDIOL 33; FDE 20).
- Collect and update data on degumming and deodorisation technologies for oil refining including water use, waste water load before and after waste water treatment (DE 50, 116, 117, 118; ES 62, 89; ANIA 42; FDE 21; FEDIOL 20, 23, 34, 25).
- More concrete data should be gathered on hexane losses (ES 41; FEDIOL 7; FDE 27).
- Distinguish between sources of waste water, e.g. stand-alone crush, refining or combined (ES 53; FEDIOL 15).

Olive oil

- Describe separately the techniques and environmental issues for conventional olive oil and extra virgin oil, etc. (ES 11).

Monitoring - Oilseed processing

- Focus on the most significant environmental parameters of oilseed processing, i.e. specific hexane consumption: yearly average consumption of solvent (hexane) expressed as kg of hexane consumed per Mt of seed processed and as monitored on the basis of the principle of bookkeeping (DE 19, 48, 72, 73; ES 42; FR 27; FEDIOL 8, 9, 32; FDE 28) and the specific energy consumption (per Mt seed processed) (ES 19; ANIA 38; FEDIOL 30) and set BAT-AEPL for hexane consumption (ES 40).
- Base BAT-AEL for VOCs in oilseed processing on specific consumption and not on emission measurements (UK 41; ANIA 40; FEDIOL 32; FDE 19).
- Base BAT-AEL on annual VOC consumption supplemented with measurements of VOC emissions from point sources (DK 12) and supplemented with short-term monitoring of hexane releases (DE 19); or effective monitoring of abatement equipment may be a useful surrogate instead of direct measurement of short-term emissions, e.g. of condensers (UK 43).
- Collect new data in general for the oilseed and vegetable refining sector including potential for heat recovery, hexane usage and emissions (ES 53, 54, 89) and especially representative real-life data on performance, applicability and economics of hexane recovery using a reboiler and gravity separator via the questionnaire (DE 114; FEDIOL 17).
- Dust, VOC (hexane and acetone) and odour are relevant parameters for emissions to air (DE, DK, FR, SE, UK – doc 3). In rape seed oil mills emission of hydrogen sulphide could be an issue (DE – doc3).
- Collect representative real-life data on wet dust emissions from oilseed processing (oilseed

<p>pressing and oil extraction) through specific questionnaires in mg/Nm³ (ANIA 39; ES 39).</p> <ul style="list-style-type: none"> • Collect representative real-life data on performance, applicability and economics in order to update Section 4.7.4.7 in the current BREF (DE 115; FEDIOL 19) • Collect and update data on odour removal efficiencies and odour concentrations at stack level when using biological treatment in oilseed processing and vegetable oil refining and update Section 4.4.3.10 (DE 105; ES 52; FEDIOL 13). • Collect data and information on the applicability and economics of thermal treatment and update Section 4.4.3.11 (DE 106; FEDIOL 14).
<p>New information identified</p> <ul style="list-style-type: none"> • Economic analysis of the production of olives and olive oil (ec.europa.eu/agriculture/olive-oil/economic-analysis_en.pdf)
<p>EIPPCB assessment</p> <ul style="list-style-type: none"> • The sector produces vegetable oil and fats from seeds and beans by mechanical or solvent extraction and refining. This includes raw materials such as soybeans, sunflower seeds, rapeseeds, flaxseeds and olives. • The production processes and environmental issues differ between raw materials and it would give more clarity to describe olive oil separately from seed oil production. • Crushing and refining takes place on most installations almost simultaneously. • Seasonal production is relevant for some raw materials. • Steam generation and electricity demand contribute to high energy consumption. Heat recovery should be covered in more detail. • Water consumption can be high and is related to cooling and process water. • Waste water generation, treatment and discharge should be considered an issue for the sector. • COD, TOC, TN and TP should be considered the relevant parameters for emission to water and, if available, also BOD, TSS and NH₄-N. • Collection of additional data in specific loads for COD or TOC should be considered (kg/unit of finished product). • Generation of production residues/solid waste is an issue, which at the same time is an asset, since it has multiple uses. • Emission to air of dust and VOC is relevant together with odour. Odour is a main environmental issue related to several of the unit operations and both primary and end-of-pipe abatement techniques should be identified. • Dust emissions are related to handling, preparation and maybe drying of raw materials prior to crushing. • Chapter V of the IED covers special provisions for installations and activities using organic solvents. Vegetable oil and animal fat extraction and vegetable oil refining activities are covered by these provisions; see Annex VII part 2 (row 19) of the IED, where emission limit values are set for solvent use per tonne of raw material. Stack release of emissions to air should be monitored if abatement equipment is applied. • Mass balances and book-keeping, used in a solvent management plan, can be accepted as an alternative for emission monitoring. • Data from stack emission monitoring, the applied abatement techniques and the related mass balance/book keeping will give a good basis to determine the overall performance and to evaluate the potential for further reductions. • Olive oil production comprises different production techniques by which different product qualities are produced. The related energy consumption, water consumption, waste water loads, emissions to air, odour and generated production residues/solid waste can differ markedly. During the collection of data and information, it should be possible to document the differences and relate the best performers within a certain product group to the applied BAT. • There should not be a focus on the actual choice of production process, but on the applied

techniques.

EIPPCB proposal

- To divide the sector to cover seeds and olives separately, but include specificities for different seed materials.
- TWG to collect waste water emissions data for TOC, COD, BOD, TSS, TN, NH₄-N, TP in concentrations (mg/l), together with either the related waste water flow (m³/time unit) or the related load (mg/time unit).
- TWG to collect data on specific loads for TOC and COD (kg/unit of finished product).
- To collect data and information on solvent mass balances, the applied abatement techniques together with stack emission monitoring of VOC emissions to air.
- TWG to collect data and information on dust emission from seed handling, preparation and drying.
- TWG to collect information on odour levels in relation to raw materials, processing techniques and applied prevention and reduction techniques.
- TWG to collect contextual information on the applied waste water treatment techniques and treatment efficiencies.
- TWG to collect information on value-added production from production residues or treatment alternatives.
- To take seasonality or campaign duration into account when appropriate.

2.2.7.7 Starch production

Summary of initial positions

- Focus on emissions to air and water (ES 43; AAF 4). For emissions to air, the BAT conclusions should focus on the drying processes and the emissions of dust (ANIA 24). For dust concentration, a differentiation should be made between dry and wet conditions. For emissions to water, BAT conclusions should focus on COD, BOD, TN, TP and TSS (AAF 4; FDE 91). Consider dust emissions from drying in starch production as a separate matter (ES 15; UK 17) and that only cyclones are allowed due to food safety (ES 14).
- Starch plants using peas could be included and described (ANIA 29; FR 5).
- All activities and raw materials should be taken into account so the relationship between resource efficiency and emissions can be illustrated (ES 44; AAF 5; FDE 92).

Data

- Include data on campaign durations, energy use efficiency, description of equipment to take seasonal activities and energy consumption into account and the raw material and products (DE 52; FR 41; AAF 8).
- Relate waste water load and composition with raw material used, e.g. TN and COD vary (ES 94).

New information identified

- No new information has been identified at this stage.

EIPPCB assessment

- Starch is produced from several raw materials such as maize, wheat and potatoes. Installations are often dedicated to use one raw material only. Starch is often not the only product produced, since starch can be further modified or converted and, depending on the raw material, oil, fibres, gluten and proteins are also produced as co-products. Ethanol produced by fermentation can be the main product.
- Water and energy consumption and residues/solid waste are relevant issues.
- Waste water generation, treatment and discharge should be considered an issue for the

sector depending on the applied milling process and co-products produced. It should be recognised that in some productions all waste water can be further processed and used for other purposes so the discharge is close to zero.

- COD, BOD, TSS should be considered the relevant parameters and, if available, also TN, NH₄-N and TP.
- For some raw materials, the production is seasonal, e.g. for potato starch.
- Collection of additional data in specific loads for COD should be considered (kg/unit of finished product) since there will be a relationship between water consumption, production processes and COD load.
- If TOC is monitored, data should be included.
- Emission of dust from drying of starch should be considered as one of the major environmental issues, but drying of co-products should be taken into consideration too. Also, dust emissions from raw material preparation should be covered.
- Air emissions from starch production are also registered in relation to energy production, which is proposed not to be covered in the FDM BREF.

EIPPCB proposal

- TWG to collect waste water emissions data for TOC, COD, BOD, TSS, TN, NH₄-N, and TP in concentrations (mg/l), together with either the related waste water flow (m³/time unit) or the related load (mg/time unit).
- TWG to collect data on specific loads for TOC and COD (kg/unit of finished product).
- TWG to collect contextual information on the applied waste water treatment techniques, cleaning processes and product range variation.
- TWG to collect data on dust emissions to air (mg/m³) from dryers and from raw material preparation supplied with data on loads (mg/time unit), including characterisation of the dust fraction, information on drying technology and applied filter systems.
- TWG to collect information on value-added production from production residues and treatment alternatives.
- To take seasonality and raw material into account when assessing data.

2.2.7.8 Sugar manufacturing

Summary of initial positions

- Focus on dust (UK 17), NO_x and TOC emissions to air from sugar pulp dryers and related process-integrated measures and abatement techniques (DE 58). Include combustion related parameters NO_x, SO₂ and CO from directly heated pulp dryers (DE, DK, FR, PL, SE, UK – doc 3).
- Include energy consumption in pulp drying and related drying techniques (DE 59; FR 38).
- TOC, TSS, TN, NH₄-N, TP but especially COD and BOD are important for waste water from washing of sugar beet in sugar production (BE, DE, PL, FR, SE, UK doc 3).
- Take the seasonal nature of the operation into account (DE 22; ES 46; FI 1; PL 3; CEFS 2; FDE 1, 61).
- Take the energy autonomy into account (DE 22; ES 46; FI 1; PL 3; CEFS 2; FDE 1).
- Odour is produced when processing sugar beet to sugar (SE 16).
- Cane sugar refining should be in a separate section within the sugar sector (IT 8, 12).

Data

- Include data on campaign durations, energy use efficiency, description of equipment (CHP, back pressure steam turbines, etc.) to take seasonal activities and energy consumption into account (FI 1; IT 11; AAF 8; ANIA 4; ATLA 20; SNFS 3).
- Include data and information on separation techniques allowing the use of most products extracted from the beet (FI 4).
- Collect information on odour abatement techniques in the sugar sector (SE 16).

New information identified
<ul style="list-style-type: none"> • VDI Richtlinie 2594 - Emission control - Pulp production in the sugar industry.
EIPPCB assessment
<ul style="list-style-type: none"> • Sugar production in the EU-28 is primarily based on sugar beet and basic sugar production is strictly seasonal. • The principles of sugar cane processing and the main differences in environmental impacts could be included as additional information. • The energy demand is high. Thermal energy or steam is relevant in both sugar juice evaporation and in beet pulp drying. Installations might have very different solutions for energy and electricity supply. • Heat recovery, energy efficiency measures and energy generation from process residues/waste are expected to have developed since the drafting of the current FDM BREF. • Waste water generation, treatment and discharge should be considered an issue for the sector. The main source of waste water is from washing and cleaning of sugar beet and evaporation condensate. • The waste water parameters COD, TOC, BOD and NH₄-N are relevant, while TSS, TN and TP are also frequently monitored. • Emissions to air of dust and TVOC from sugar pulp drying are considered a major environmental issue. Depending on the drying method and the fuel used for firing, NO_x could be high. CO could be an operational control parameter for both the combustion process and the drying process. • Odour is often encountered in relation to sugar installations.
EIPPCB proposal
<ul style="list-style-type: none"> • To collect contextual information on the applied waste water treatment techniques, cleaning processes and product range. • TWG to collect waste water emissions data for TOC, COD, BOD, TSS, TN, NH₄-N, and TP in concentrations (mg/l), together with either the related waste water flow (m³/time unit) or the related load (mg/time unit). • To collect data on specific loads for TOC and COD (kg/unit of finished product). • TWG to collect data on dust and TVOC emissions to air (mg/m³) from beet pulp dryers supplied with data on loads (mg/time unit) and contextual information on dryer type and applied waste gas treatment. • TWG to collect data on NO_x, SO₂ and CO emissions to air from directly heated beet pulp dryers and contextual information on fuels and combustion systems. • TWG to collect information on odour, odour sources and applied techniques. • To collect information and new data on techniques for heat recovery and other techniques for high energy efficiency. • TWG to collect information on sugar production based on sugar cane. • To take seasonality into account when assessing data.

2.2.7.9 Coffee manufacturing

Summary of initial positions
<ul style="list-style-type: none"> • Emissions from roasting depend on the roasting process, which depends on the desired final product quality, e.g. torrefacto have higher emissions to air (ES 13). • Focus on emissions to air of TOC, CO, NO_x, dust and odour (DE 60). • Environmental issues differ between coffee and instant coffee (DE 66). • NO_x emissions from coffee roasting should be reassessed according to the concluding

<p>remarks in the current BREF. The concentration of NO_x associated with roasting of decaffeinated coffee seems to be lower. (IT 15).</p> <ul style="list-style-type: none"> • COD, BOD, TSS, TN, NH₄-N and TP could be relevant in waste water (PL doc 3).
<p>New information identified</p> <ul style="list-style-type: none"> • VDI Richtlinie 3892 - Emission control - Roasted coffee-producing industry - Plants with a minimum daily output of at least 0.5 tonnes. • Information on NO_x levels from roasters is available from Italy.
<p>EIPPCB assessment</p> <ul style="list-style-type: none"> • Coffee products include whole roasted beans, ground coffee, decaffeinated products and instant coffee. • In the current BREF, there are no specific data on the manufacture of coffee products. A more targeted data collection needs to be performed in order to confirm whether waste water generation could be relevant for some products. • Sorting and cleaning of green beans and roasted beans could be a source of dust emissions. • Roasting of coffee beans generates emissions to air of odour, TVOC, CO and dust. Odour could be related to amines and mercaptans that are not covered by the TVOC parameter. • Emissions of NO_x should be covered according to the concluding remarks in the current BREF. NO_x is generated during the combustion process for producing the drying gas but also during thermal oxidation, which is widely used as end-of-pipe treatment for the dryer waste gases to abate VOCs and odour. • Production of special products such as torrefacto, where added sugar in roasting creates higher emissions, can be taken into account by collecting the necessary contextual information on the product produced. • The inclusion of more detailed descriptions of coffee roasting techniques in Chapter 2 should be considered and the collection of information on heat recovery techniques and performance. • Production of instant coffee and of decaffeinated coffee implies further process steps that could generate waste water and other relevant emissions to air from drying.
<p>EIPPCB proposal</p> <ul style="list-style-type: none"> • TWG to collect data on dust emissions to air (mg/m³) from the coffee roaster, instant coffee dryers and from raw material preparation supplied with data on loads (mg/time unit), including characterisation of the dust fraction, information on roasting technology, drying technology and applied abatement systems. • TWG to collect data on TVOC, CO and NO_x emissions to air and additionally information on odour levels. • TWG to collect general information and data on the generation of waste water in the sector. • TWG to collect information on heat recovery and energy efficiency techniques.

2.2.7.10 Animal feed

<p>Summary of initial positions</p> <ul style="list-style-type: none"> • Dust emissions are relevant and should be developed specifically (RO 11; UK 17). • Dust emissions from material handling, grinding and milling should be included (FR doc 3; UK; FEFAC doc 3) • Waste water is not considered an issue (BE, DE, FR, PL, SE, UK – doc 3), except for rendering activities (FR doc 3). • Preparation of farm animal feed including drying of green fodder should be covered (DE 63; FR 2). Air emissions related to drying should be covered including dust, VOC, NO_x,

SO ₂ , Co and odour (DK, FR – doc 3).
New information identified
<ul style="list-style-type: none"> • Regulation No 68/2013 (Catalogue of feed materials).
EIPPCB assessment
<ul style="list-style-type: none"> • Animal feed covers all feed for animals in general. Prepared feed for e.g. farm animals is based mainly on grains and green fodder, while pet feed can include mixing of vegetable and rendering fats and meat, where extrusion is applied for dry products. • The current descriptions in all the chapters of the FDM BREF should be developed to comprise at least the main product groups. • Production and canning of wet feed should be described. Special feeds, such as feed for fur animals, could be described. • Rendering is covered in the SA BREF and should not be developed further in the FDM BREF. A cross-reference will be sufficient. • Extrusion can be energy-intensive and waste water from cleaning could be an issue, but is not explored in the current BREF. • Drying of green fodder is both energy-intensive and gives rise to emissions to air of dust and odour. Energy savings and drying technologies including fuel selection should be explored. • Air emissions can be relevant from energy production, which is proposed not to be covered in the FDM BREF. • Production of feed from grains gives rise to dust emissions from the handling of raw material and during crushing, granulation and milling. • The character of the dust regarding particle size distribution and especially whether it is a wet or dry dust emission could differ within the sector. Humid emissions from drying or extrusion processes would have different challenges to a dry emission, e.g. from grain milling.
EIPPCB proposal
<ul style="list-style-type: none"> • TWG to collect new information on the animal feed sector in general. • TWG to collect general information and data on waste water generation. • TWG to collect data on air emissions from green fodder drying, from handling and preparation of grain-based feed and from extrusion in compound feed manufacture, including at least dust. • TWG to collect information on the character of the dust regarding particle size distribution and whether it is wet or dry. • TWG to collect information on odour sources and related abatement techniques. • TWG to collect information on drying technologies and possible energy savings. • To take seasonality into account for some raw materials.

2.2.7.11 Brewing

Summary of initial positions
<ul style="list-style-type: none"> • Split the processes and environmental impacts between conventional and non-alcoholic beer. Non-alcoholic beer may lead to larger energy and/or water consumption (ES 85). • Emission to water of condensed alcohol from the manufacture of non-alcoholic beer is not a key issue (DK 16). • Diatomaceous earth is no longer a source of TSS in waste water (DE 23). • The parameters COD, BOD, TSS, TN are important and monitored. Sometimes NH₄-N and TP are included (BE, DE, FR, PL, SE, UK doc 3). • A measure of COD in effluent kg normalised to product output is a useful process

efficiency measure. Relevant to brewing and soft drinks (UK 39).
New information identified
<ul style="list-style-type: none"> • Flemish BAT studies concerning (1) dairy, (2) drinks (malt, beer, non-alcoholic drinks, alcoholic drinks, wine), (3) fruit and vegetables, (4) meat and fish (in Dutch) (BE 4). • BAT in beer production, 2013, Deutscher Brauer-Bund. • BAT for breweries, 2011, Nordic Council.
EIPPCB assessment
<ul style="list-style-type: none"> • Although conventional beer is the main market product, some MS have considerable production of low-alcohol beer. The specificities of this production should be described in the BREF. • The generation of waste water is considered an issue, where COD is the main parameter. Other general parameters could include BOD, TSS, TN, NH₄-N and TP. • If TOC is monitored, data should be included. • Collection of additional data in specific loads for COD should be considered (kg/hl beer produced) since there will be a relationship between water consumption and COD load. • Techniques for reducing water consumption and energy consumption should be updated including techniques for heat recovery. • Odour is considered an issue and information should be collected and included in the FDM BREF. • Air emissions can be relevant from energy production, which is proposed not to be covered in the FDM BREF. • Emission of ethanol to air from the production of low-alcohol beer is not covered well in the current BREF and information and data should be collected to show its relevance. • Dust emissions are related to raw material handling, milling and drying of spent grain. This is not well-documented in the current BREF. • Information and data on production residues and possibilities for treatment and recovery should be updated.
EIPPCB proposal
<ul style="list-style-type: none"> • TWG to collect waste water emissions data for COD, and include available data on TOC, BOD, TSS, TN, NH₄-N, TP in concentrations (mg/l), the related waste water flow (m³/time unit) or the related load (mg/time unit). • TWG to collect data on specific loads for TOC and COD (kg/unit of finished product). • TWG to collect contextual information on the applied waste water treatment techniques, cleaning processes and product range variation. • To offer the possibility to report air emissions data if relevant. • TWG to collect new information on the production of low-alcohol beer and describe it separately. • TWG to collect information on the reduction of water and energy consumption including techniques for heat recovery. • TWG to collect information on treatment alternatives from production residues.

2.2.7.12 Distilled beverages

Summary of initial positions
<ul style="list-style-type: none"> • Ethanol loss from the distilling process is more important than from the ageing stage but is still very low (ANIA 46; spiritsEUROPE 4). • Ageing of spirits is a specific source of VOC emissions and should be dealt with separately from wine (FR 17). • Dust could be an issue from processing of raw materials and drying of spent grains, while

emissions of ethanol (VOC) is inseparable from the process (BE, DE – doc 3).
New information identified
<ul style="list-style-type: none"> • None.
EIPPCB assessment
<ul style="list-style-type: none"> • Distilled beverages and wine are described separately in the current BREF. The descriptions should be further developed separately. • The VOC losses from both distillation and from ageing are not documented in the current BREF. The VOC loss from ageing is a diffuse emission. There is a lack of documentation to show that VOC emissions are a key environmental issue. • Distillers' spent grains are the main solid waste generated and can be recovered for other uses. • More information on dust generation from handling of raw materials and the drying of spent grains should be collected. • Waste water is generated from liquid by-products, such as mash water from grain-based distilled beverages with a high COD content. The waste water is an environmental issue, but new alternatives to treatment have been developed such as production of biogas by anaerobic digestion. The alternative treatments of waste water should be covered in the BREF. • The copper content in waste water or sludge from residues originating from the copper stills in whiskey production could be an issue and should be investigated. • The sector is characterised by batch production, which has to be taken into consideration when assessing data on waste water discharges.
EIPPCB proposal
<ul style="list-style-type: none"> • TWG to collect waste water emissions data for TOC and COD, and include available data on BOD, TSS, TN, NH₄-N, TP in concentrations (mg/l), the related waste water flow (m³/time unit) or the related load (mg/time unit). • TWG to collect data on specific loads for TOC and COD (kg/unit of finished product). • TWG to collect all available data and information for copper emissions to water. • TWG to collect contextual information on the applied waste water treatment techniques, cleaning processes and batch processes. • TWG to collect potential air emissions data (not related to energy production). • TWG to collect new information on alternative treatment of waste water to generate energy and on treatment alternatives for production residues. • TWG to collect information on the reduction of water and energy consumption including techniques for heat recovery.

2.2.7.13 Additional sectors and activities

Summary of initial positions
<ul style="list-style-type: none"> • The following sectors have a major impact on the environment and should be developed in terms of Chapters 4 and 5: Section 5.30 Bread, cookies, snacks, chocolate and candy. Section 5.2.9.3 Soft drinks. Section 5.2.9.4 Juice (EEB 36). • Production of Wine does not have any air emission or waste water related major issues (BE, DE, FR – doc 3) • Bread and confectionary manufacture does not have any air emission or waste water related major issues (BE, DE, FR, PL – doc 3). • For grain mill products dust from grain milling (RO 14), dust from flour production and from handling of raw materials, should be taken into account (DE, DK, FR, Se, UK – doc3). Waste water is not considered an issue (BE, DE, FR, PL, SE, UK doc 3).

New information identified
<ul style="list-style-type: none"> • VDI guideline 3893. Installations for roasting cocoa and producing cocoa mass. • ES BAT guide for wine and cava (in Catalan).
EIPPCB assessment
<ul style="list-style-type: none"> • The identification of environmental issues is a key step of the BREF review. • In a few sectors, the generation of waste water is insignificant or not problematic and dedicated waste water treatment plants are not used. • Some activities and sectors are included in the current BREF, but are not covered under a specific section in this document (see Sections 2.2.7.2 -2.2.7.12), since few positions or comments were received regarding environmental issues. This does not imply that these sectors should be excluded from the revised BREF. Common for these sectors are that the information regarding emissions and consumption is largely missing and environmental issues are only vaguely formulated in the current BREF. • The sectors include: <ul style="list-style-type: none"> ○ confectionary manufacture including cacao beans and powdered cocoa; chocolates, cakes, biscuits and boiled sweets; ○ bread manufacture; ○ dry pasta manufacture ○ malting ○ yeast production ○ wine making ○ grain mill products • Since the key issues in the sectors are not well-defined, updated information should be collected. • The information collected could include drying of confectionary and dry pasta with a special regard to energy efficiency and heat recovery, which could also be relevant for baking. Also data could be collected for dust emissions to air from milling and from raw material preparation regarding grain mill products. Some of the sectors might handle waste water. This could create a basis for at least updating the descriptions. Data from these additional sectors could be collected for the most general parameters.
EIPPCB proposal
<ul style="list-style-type: none"> • TWG to collect information and data from additional sectors, including emissions to air and water, water and energy consumption, and related techniques covering energy-efficient techniques and heat recovery.

2.2.8 Diffuse emissions, odour and noise

Summary of initial positions
<p><u>Diffuse and fugitive emissions</u></p> <ul style="list-style-type: none"> • Do not set BAT-AELs for diffuse or fugitive emissions (ES 60). • Collect information on diffuse and fugitive emissions monitoring to propose a proper decision framework (ES 60). <p><u>Odour</u></p> <ul style="list-style-type: none"> • Odour is regulated by Member States. Any description of this issue should therefore be kept at a generic level and no emission level should be introduced in the FDM BREF (CLITRAVI 20). • Odour is a relevant environmental issue for some activities. Focus on preventive and

process-integrated techniques (BE 11), e.g. in the sugar sector (SE 16).

- Odour is a key issue for several sectors, related to design and operation of effluent treatment plants. Information on techniques and principles of odour control strategies should be included (UK 23).
- Do not include requirements on measurement methodology or frequency concerning odour (SE 7).
- A requirement of odour is improper, since devices to indicate odour are not available in all cases (FI 12).
- Base BAT on odour on wording of recent BAT conclusions, e.g. CWW BREF (FR 26).
- A more risk-based approach to the selection of odour control techniques is required based on an odour management plan (FDE 63).
- Noise and odour are key environmental issues for most sectors, but BAT conclusions should not have BAT-AELs (DK 18).
- Do not set BAT-AELs for noise or odour (DK 18; ES 58, 59; FI 12; CLITRAVI 6, 7, 20), but include qualitative BAT conclusions for relevant sectors that are precisely formulated with controllable conditions appropriate for a permit (DK 18).

Noise

- Noise and odour are key environmental issues for most sectors, but BAT conclusions should not have BAT-AELs (DK 18).
- Noise should not be taken into account, since not covered in other BREFs either (FDE 32).
- Noise should not be included since it is a national matter (CLITRAVI 63).
- Do not set BAT-AELs for noise (DK 18; ES 58, 59; FI 12).

New information identified

- Odour guidance 2010, Scottish Environment Protection Agency.
- JRC Reference Report on Monitoring (ROM).
- CWW BREF.

EIPPCB assessment

Diffuse and fugitive emissions

- Various diffuse and fugitive emissions could be a considerable source of pollution in some FDM sectors and preventive measures should be described in the FDM BREF.
- Results of monitoring of diffuse emissions are more complex to compare than monitoring of channelled emission sources, due to the multiple factors that affect the sampling procedure.
The quantification of diffuse and fugitive emissions might not be easy and is, in general, labour- and cost-intensive. Measurement techniques are available, but the measurement uncertainty might be relatively high and, therefore, the level of confidence in results might be low.

Odour

- Odour is recognised as a relevant problem in the several FDM sectors and there are both preventive and abatement techniques applied. A description of techniques to prevent or reduce odour emissions is considered important for reducing the relevant environmental impact of FDM plants.
- Odour is the main nuisance registered by neighbouring communities in relation to FDM plants. The magnitude of odour nuisance depends on the location of the installation and the character of the immediate neighbouring areas.
- Odour emissions are more often caused by diffuse sources.
- Odour should primarily be regulated on the basis of locally determined conditions and not on a general specific emission level. The performance levels that need to be achieved depend on local conditions (e.g. distance to residential or other sensitive areas).
- In the "Recommendations for future work" chapter of the current FDM BREF (Chapter 7.5), there is a specific reference to assess the application of non-thermal plasma treatment of odours in the FDM sector.

<p>Noise</p> <ul style="list-style-type: none"> • The prevention/reduction of noise emissions is a generic issue that cuts across the FDM sector and should be covered on such a basis. • Techniques to reduce noise emissions are generally applied at FDM sites and relevant information should be included in the FDM BREF. • The impact from noise should primarily be regulated on the basis of locally determined conditions and not on a general specific emission level. • The performance levels that need to be achieved depend on local conditions (e.g. distance to residential or other sensitive areas).
<p>EIPPCB proposal</p> <ul style="list-style-type: none"> • TWG to collect information and general data on diffuse and fugitive emissions and odour. • TWG to collect updated information on techniques for noise reduction.

2.2.9 Accidental releases from FDM installations

<p>Summary of initial positions</p>
<p>General positions</p> <ul style="list-style-type: none"> • BAT on environmental accidents should be general for all FDM sectors (PL 33). • Include descriptions of the most important environmental risks typical for each of the FDM sectors (FI 9). • The current Section 4.6 on prevention of accidents should be deleted since risk prevention is a part of the environmental management system and already described for example in the SEVESO Directive (EEB 24). • State clearly that the safety or environmental risk topics are out of the scope since covered by other legislation (ES 24). <p>Concerning specific risks</p> <ul style="list-style-type: none"> • Accidental emission to air of refrigerants should be analysed in depth and assessed since provisions are laid down in regulations, e.g. in the dairy sector (IT 10). • Dust explosion and fire risk is a relevant environmental issue for some activities and techniques to prevent or reduce risks should be included (BE 13). • Accident prevention and secondary containment is a key environmental issue for the sector (UK 22). • Expand descriptions on containment process controls (FDE 69) and BAT standards for remote containment that are not described in the EFS BREF and so should be set out here (UK 22). • Storage should be covered by the EFS BREF (ES 23). • Add further techniques to prevent accidental releases from processes damaging the WWTP and/or the operation of the WWTP, caused by them receiving a sudden high load (SE 1).
<p>New information identified</p> <ul style="list-style-type: none"> • Report C736: Design of Containment Systems for the Prevention of Water Pollution from Industrial Accidents, CIRIA (The Construction Industry Research and Information Association). • Regulation 842/2006, Regulation 303/2008, Regulation 1005/2009.
<p>EIPPCB assessment</p> <ul style="list-style-type: none"> • Prevention of accidents is covered in the current BREF in Chapter 4 with general descriptions and as part of an EMS. It includes a few references to operational techniques. • It is a prerequisite that the EMS contains descriptions of those actions or applicable techniques that should be taken into account in order prevent to the highest degree any

environmental accident or accidental release.

- The Seveso Directive covers the prevention of major accidents with a specified list of substances or group of substances. The requirements in the Seveso Directive should not be repeated in the FDM BREF. Prevention of accidental releases other than those covered by the Seveso Directive could be covered in the FDM BREF.
- Accidental releases of refrigerants represented more than 80 % of the total release of refrigerants from the FDM sector, for those installations that reported to E-PRTR in 2011. Relevant preventing emission prevention measures are included in Regulations (EC) No 1005/2009 and No 517/2014 of the European Parliament and of the Council and should not be repeated in the FDM BREF.
- The EFS BREF covers storage and transfer/handling of liquids, liquefied gases and solids in IED installations, including a range of containment techniques and other storage techniques also relevant to the FDM sector.
- If groups of techniques or specific challenges are identified for one or more FDM sectors that are not sufficiently covered in the EFS BREF, a description of these special issues and the related specific techniques for their prevention or reduction could be included in the FDM BREF.

EIPPCB proposal

- To describe the major environmental risks encountered in the sector by collecting specific information on this issue to improve information in the current BREF.
- To include operational techniques to prevent and reduce the identified risks for environmental accidents and accidental releases including accidental releases of refrigerants.
- To include techniques for the prevention of environmental accidents and accidental releases, at least in the general part of the conclusions, e.g. for the EMS and for storage if applicable.
- To add a cross reference to the EFS BREF in the BAT conclusions and add proper references to the Seveso Directive and Regulations (EC) No 1005/2009 and No 517/2014 of the European Parliament and of the Council in the rest of the BREF.

2.3 DATA AND INFORMATION COLLECTION

The exchange of information is the core of the Sevilla process. The data and related contextual information, updated information on techniques and other information are a vital part of reviewing a BREF and the most important contribution from TWG members and the sectors or interests that they represent.

The consumption and emissions data in particular are important for identifying the best performers, and to identify an environmental performance range (a BAT-AEPL) that is associated with the use of BAT.

The data, related contextual information, updated information on techniques and proposals for text amendments, should be provided following the structure and format indicated by the EIPPCB.

The EIPPCB follows the provisions of the BREF Guidance and will provide an installation-specific questionnaire, a standard for describing techniques (standard 10-heading format) and information mapping sheets for submitting additional information.

The performance data submitted in the past from the TWG members to the EIPPCB were often not sufficient in terms of either quality or quantity, and were not always accompanied by the necessary supporting operational and contextual information. Therefore, these performance data were of limited use in the process of determining BAT and environmental performance levels associated with the use of BAT.

Therefore, the focus of the review will be to collect data and information on installation- and production-specific emission and consumption levels in order to have a firm basis for the determination of BAT.

It is important to discuss and agree at this KoM on the consequence of the following statements concerning the data and information collection:

- Data and information should lead to the determination of BAT;
- Data and information should be representative;
- Deadlines should be set to enable a broad participation delivering good data, but also taking the overall progress of the review into consideration.

2.3.1 Questionnaire development and data collection

Summary of initial positions
<p>General issues</p> <ul style="list-style-type: none"> • Collect new plant-specific emission data in general (FI 20). • Collect plant- and process-specific data and information in order to draw firm BAT conclusions (AT 2). • The data and information collection should lead to an overall update of the BREF and especially Chapter 4 in the current BREF (IT 14). • The current values in Chapters 3, 4 and 5 of the document, e.g. for the dairy sector, are not representative of the sector or for representing BAT. Should those data be a part of the future FDM BREF it is necessary to build a Task Force to update the values (DE 64; VDM/MIV 1). Define the required monitoring information, including the information on reference conditions that need to be submitted with the questionnaire (FR 40). • Uncertainties in monitoring make it impossible to state an emission level unless equal monitoring requirements are used, e.g. questionnaire must include monitoring conditions together with description of flow profiles, see Mon reference document (EEB 9). • Present the emission levels based upon reliable, collected real-life data; include

information about the measurement and the averaging period (AT 6; DE 29) and at the level of processes (AT 7).

- Questionnaires should be sector-specific (DE 61).
- Because of the realistic data availability, BAT-AELs should not focus on the level of unit operations but at production site level within the specific sector (CLITRAVI 39, 49).

Data collection specific

- Evaluate the necessary number of plants and data sets per sector based on the list provided, to represent the different situations to define BAT-AELs. (FR 43, 44).
- Collect data and distinguish between new and existing installations (ES 47; CLITRAVI 58, 57).
- Take seasonality into account (FR 41; IE 7; SE 12; AAF 8; ANIA 4; ATLA 20; SNCF 3) and consider effluent flow (flux, volumes) along with effluent concentration in the case of seasonal activities (ANIA 4).
- Relate plant capacity with environmental performance and applicability of techniques (DE 65).
- Depending on the raw material used, the content of the effluents in different elements may vary. For example, starch can be obtained by processing wheat, maize, potatoes, peas, rice. The content of nitrogen/proteins is different for each crop and if the cereals are dried or not (AAF 14).
- Data collection regarding TN should reflect variations in denitrification efficiencies due to climatic conditions during the year or a change in raw materials (SE 13; ANIA 13; ATLA 15, 24, 30; FDE 44; SNFS 5).
- Collect data not only on VOCs but also on other similar parameters like NMVOC (FR 25).
- In the data collection questionnaires, create different fields and sections for collecting the different types of emissions to air – channelled, diffuse or fugitive (ES 17).

Questionnaire development

- In order to optimise the data collection questionnaire, a subgroup or informal meeting could be helpful. The technical experts from the sectors can facilitate the identification of key environmental issues per process and decide on the units based on the type of available data and design the data and information collection for each manufacturing process. List for every process the possible techniques that can be applied (cross-referencing to avoid repetition of descriptions) (ES 21, 34, 48).
- Create a subgroup to design the data and information collection for each manufacturing process since techniques and performances should be clearly divided between different sectors (ES 48).

Data collection process

- Information could be gathered via European associations and data via the questionnaires (AFF 3, 4).

New information identified

- JRC Reference Report on Monitoring (ROM).
- Several TWG members are in the process of collecting data and information.

EIPPCB assessment

General issues

- The revision of the BAT conclusions consist a main goal of the FDM BREF review, where the data and information collection is the most important step in the exchange of information within the TWG.
- In order to be able to derive environmental performance levels associated with BAT (an in particular BAT associated emission levels) in the revised FDM BREF, it will be necessary to collect new and updated representative, reliable and installation-specific real-life data.
- The original FDM BREF contains limited data and information on the current

consumption and emission levels and on the performance of techniques to be considered in the determination of BAT.

- The data and information collection will therefore also serve the purpose of updating the entire FDM BREF, especially Chapter 3 "Current emission and consumption levels" and Chapter 4 "Techniques to consider in the determination of BAT". This is also recommended in the "Recommendations for future work" chapter of the current FDM BREF (Chapter 7.5), where it is mentioned that revised data should be linked with process descriptions, operating conditions, and sampling and analytical methods.

Data collection specific

- The data and information should generally cover:
 - quantitative data (e.g. emission data, consumption data and plant operational parameters);
 - qualitative data (e.g. information regarding techniques used, production processes and raw materials).
- A common, but flexible, questionnaire template will be drafted, which would be able to capture the complexity of the FDM sector, where several production processes, leading to different types of products are included.
- The format and extent of the questionnaire should ensure that data and information submitted are:
 - relevant to the determination of BAT;
 - The TWG should agree on the pollutants and parameters for which data and information should be collected, which might be related to sectors. This is already foreseen and considered in Section 2.2.7.
 - provided in a common format that allows uniform assessments and comparisons;
 - Data should preferably be submitted from an agreed reference year with the newest information available. For seasonal activities where data could be limited, two consecutive years or campaigns might be more appropriate.
 - Data obtained by the same monitoring approach are more easily comparable when assessing the environmental performance.
 - Data should be clearly related to units, reference conditions and averaging periods. This is already foreseen and considered in Section 2.2.5.
 - Data should be clearly related to applied sampling and monitoring standards. Information on the use of EN/ISO or (other) monitoring standards will be part of the information requested and should be further used in the definition of BAT for monitoring. This is already foreseen and considered in Section 2.2.5.
 - expressed in a manner that fully relates the performance with the operating context.
- The activities included in the data collection will be those corresponding to the scope on which the TWG will agree at the KoM.
- The participation of installations in the data collection is on a voluntary basis. Each TWG member's organisation should propose a list of installations willing to participate, focusing on well-performing plants. The deadline to submit these lists is proposed to be 19/12/2014.
- The number of installations in each sector varies and it is not feasible to collect data from all installations.
- The data collection should be performed among well-performing plants, since this will be the basis for determination of BAT.
- For the purpose of comparability the number of installations should reflect the possible variation in emission and consumption levels.

- The criteria for selecting installations should therefore include factors already mentioned in some of the initial positions concerning the distinction between different categories of installations/products:
 - Installations should be representative of the sector in terms of products produced;
 - Both single product plants and more complex multi-product plants should be included in order to show the variation;
 - Both new and existing plants should be represented;
 - Based on the production capacity of the plant/installation, both smaller and larger plants/installations should be included;
 - Seasonal activities or production should be taken into account;
 - Installations in both cold and warm climates should be covered.

Questionnaire development

- Based on the positions received, the EIPPCB intent to draft a common questionnaire for the collection of data on emissions to air and water.
- The necessary contextual information related to each sector will be drafted on individual sheets.
- The detailed content should not be discussed in detail at the KoM, but will be further developed based on the general discussions and agreements taken during the KoM.
- The TWG will contribute further to the refinement of the questionnaire templates by active participation on BATIS.
- It is foreseen that the development the questionnaire will take place in the coming months and be finalised by the end of January 2015.
- The draft questionnaire template could be tested by a small number of installations as a quality check before the final version is distributed.
- Any potential need for creation of specific subgroups should be discussed during the KoM.

Data collection process

- The final questionnaire template should be sent to and collected from operators with a preliminary check of the Member State representative (or other organisation in case the Member State is not present in the FDM TWG). This quality assurance check is foreseen in the BREF Guidance, Section 4.4.2. In this step, each Member State representative is asked to:
 - ensure the quality, completeness and consistency of data;
 - check the validity of confidentiality claims: if some information is claimed to be confidential, the Member State representative extracts the confidential part of the questionnaire and sends this separately to the EIPPCB by email;
 - to post non-confidential questionnaires onto BATIS.
- A quality check of the submitted data is however the responsibility of all TWG members, including the EIPPCB. All organisations and individual TWG members are encouraged to participate in the evaluation and assessment of individual submitted data.

EIPPCB proposal

- TWG to collect data using a common questionnaire template, but with individually designed parts for sectors as appropriate.
- TWG to collect data in all sectors covered in the BREF scope as agreed in Section 2.1 and to include those key environmental issues agreed in Section 2.2 in the questionnaire.
- TWG to collect representative, reliable, real-life data, at least at installation level from installations that at a minimum fulfil the following criteria:
 - are representative of the sector as a good environmental performer;
 - are representative of the sector in terms of products produced, covering seasonal

- activities;
 - include preferably both single and multi-product installations;
 - include preferably both new and existing installations;
 - include preferably both small and large production capacity installations;
- To set 2014 as the reference year for the data collection.
 - For seasonal activities where data could be limited, two consecutive years or campaigns might be more appropriate.
 - The EIPPCB will provide a draft questionnaire template on BATIS that will be discussed and further developed by the TWG.
 - The final draft questionnaire template should be tested by a small number of installations.
 - TWG to submit a list of well-performing plants/installations that are willing to participate in the data collection. The EIPPCB will provide a list template to be used.
 - Member State representative to collect the filled-in questionnaires from operators and to check the quality of the data and information before posting them on BATIS. The quality check implies that the Member State representative:
 - will ensure the quality, completeness and consistency of data;
 - will check confidentiality claims: if some information is claimed to be confidential, the Member State will extract the confidential part of the questionnaire and send it to the EIPPCB by email;
 - will post all the non-confidential questionnaires onto BATIS.

2.3.2 Techniques to consider in the determination of BAT and emerging techniques

Summary of initial positions

- Several techniques (primary and end-of-pipe measures) to be updated, and carefully assessed and new aspect added (DE 107; ES 52; SE 9; IT 6; AAF 2, 3; ANIA 21; CLITRAVI 64, 65, 66, 68; EDA 38, 40; FEDIOL 34; VDM/MIV 10, 12, 26, 31, 32, 33, 36).
- Delete obsolete techniques in Chapter 4 (ES-AND 114; FI 16; IT 6; CLITRAVI 71; EDA 37; PL 15; VDM/MIV 9, 34, 36, 37, 38, 40; ES 51).
- All elements to decide if a technique can be selected as BAT must be available in the description of the technique (Chapter 4) (DE 45; BE 2; ES 47, 88, ES-AND 110; PT 7; AAF 3; ANIA 22; EDA 33).
- For each process step, several BAT might be eligible and the information collection on techniques should focus on the applicability issues, e.g. in relation to food safety, product quality or other requirements, and the related cross-media effects (DE 45; ES 88; IT 13; AAF 3; ANIA 22; FDE 18; FEDIOL 3).
- Section on waste water treatment (Section 4.5) should be updated, to focus on sectors and the effect of combination of techniques and addition of new techniques (PL 13; EDA 35), e.g. for dairy products (Fig. 4.45) (DE 112; VDM/MIV 11).
- Collect data on process control techniques to check effective operation of abatement equipment for removal of particulates to air (UK 20).
- Focus on preventive and process-integrated techniques to reduce the load in untreated waste water (BE 14, 15).
- Techniques that cannot be supported by data should not be included (RO 10, FDE 62).
- Review BAT candidates for degumming as mentioned in concluding remarks (DE 50; ES 62).

Emerging techniques

- UV/ozone odour abatement is available, but not for all sources/sectors (CLITRAVI 80).
- Some current BAT should be considered as emerging techniques (AAF 2; ANIA 21).

<ul style="list-style-type: none"> • Update emerging techniques section with available information on alternatives to conventional CIP (ice pigging, ECA, etc.) (UK 50). • Include descriptions of other and innovative new products processes, e.g. betain extraction, succinic acid, to focus on innovation (ANIA 3; ATLA 18).
<p>New information identified</p> <ul style="list-style-type: none"> • Dairy industry members will provide update of waste water treatment techniques in this sector. • CLITRAVI on use of UV/ozone odour abatement. • SCI paper: Methodology for selection of best available techniques (BAT) at the sector level; Journal of Cleaner Production; 01/2000; 8(1):11-21.
<p>EIPPCB assessment</p> <ul style="list-style-type: none"> • Chapter 4 on “candidate BAT” contains all the techniques applied in order to prevent or reduce the environmental impact. The chapter will be updated with the information already provided and with the further information that will be collected via the forthcoming data and information collection. • The update of the chapter will focus on the link between the techniques applied and their environmental performance. Information should be collected for both the in-process and end-of-pipe techniques applied. This could lead to the inclusion of new techniques and the exclusion of others. • TWG members should participate and submit this information. When providing information on "Techniques to consider in the determination of BAT", the use of the 10-heading structure, see BREF Guidance Section 2.3.7., is required in order to enable comparisons of techniques and so that an objective assessment against the definition of BAT given in the IED can be made. • A range of organisational/procedural conclusions on BAT is present in the current BREF and will be revised during this FDM BREF review. All the relevant comments on this will be considered in the drafting of D1. • In the "Recommendations for future work" chapter of the current FDM BREF (Chapter 7.5) it is stated that degumming of vegetable oils should be fully appraised during the review of the FDM BREF. <p><u>Emerging techniques</u></p> <ul style="list-style-type: none"> • In the current Chapter 6 of the FDM BREF “Emerging techniques” there is one single technique mentioned. • The emerging techniques have to match the definition given in the IED and the BREF Guidance.
<p>EIPPCB proposal</p> <ul style="list-style-type: none"> • TWG members to identify and submit information on recent developments for both in-process and end-of-pipe techniques, which meet the definition of candidate or emerging technique given in the IED and the BREF Guidance, following the 10-heading structure of BREF Guidance Section 2.3.7. <ul style="list-style-type: none"> ○ A consequence of this is that techniques which do not meet the definition of candidate or emerging technique given in the IED and the BREF Guidance will not be included in the descriptions of potential BAT or emerging techniques. • To take into consideration the initial positions and information from the TWG members on techniques together with the additional issues mentioned in Chapter 7 "Recommendations for future work" of the current FDM BREF for the revised first draft (D1) of the FDM BREF. • A proposal for a template for collecting information on potential BAT and on emerging techniques is posted on BATIS.

2.3.3 Cross-media effects and economic viability

<p>Summary of initial positions</p> <ul style="list-style-type: none"> • Include potential cross-media effects for each BAT to improve overall environmental impact of the installation (AFF 3). • Collect economic information, such as capex/opex (capital expenditure/operational expenditure) for each technique (DE 44; IT 13; AAF 2; ANIA 21). • An environmental balance for better analysis of the viability of its implementation should be done for each BAT (PT 7). • Include cost/benefit aspects to avoid companies making investments with limited environmental impact (ANIA 18; ATLA 9). • Put more emphasis on the net environmental benefit achieving specific targets versus energy cost, e.g. by discussing gross and net environmental impacts considering: energy consumption; waste outputs; environmental cost/benefit of financial resource use should be provided (EDA 34).
<p>New information identified</p> <ul style="list-style-type: none"> • ANIA can provide data on payback times for some techniques.
<p>EIPPCB assessment</p> <ul style="list-style-type: none"> • The description of each candidate BAT needs to consider all aspects of the applicability including cross-media effects and economic aspects. • The "Recommendations for future work" chapter of the current BREF (Chapter 7.5) mentions seeking economic information about the costs of investing in and operating techniques and the associated direct and indirect savings. • Some of the background for performing a cost-benefit analysis is illustrated in the updated description of techniques by the economics, the cross-media effects, the applicability and the technical limitations of the technique. • The techniques included in the BAT conclusions are a subset of the candidate BAT described in Chapter 4. • The list of BAT in the BAT conclusions is neither prescriptive nor exhaustive.
<p>EIPPCB proposal</p> <ul style="list-style-type: none"> • To collect and include more comprehensive information on cross-media effects and economics, e.g. capex/opex, via the template for collecting information on potential BAT and on emerging techniques, see also Section 2.3.2.

2.4 STRUCTURE

2.4.1 BREF structure

Summary of initial positions
<ul style="list-style-type: none"> • There is a need for a clearer structure of the FDM BREF (BE 1). • The FDM BREF should be divided into individual sectors; the structure should be altered towards a more sector-focused approach (UK 10, 12, 13, 14; CLITRAVI 1, 41, 44, 47, 48). • Revise the structure, developing a more detailed description of the individual FDM sectors (IT 4). • Structure should be based mainly on the description of the individual FDM sectors (RO 6, 7, 8). • Structure should allow the description of specific processes of sectors to be more comprehensive when necessary (ANIA 20, FDE 17) and the structure could follow the division of sectors in the current Figure 5.1 with a few changes/supplements (DK 9). • Maintain a generic section and some chapters dedicated to the main processes and develop a more sectorial, clear and comprehensive approach (ES 10, 12, 16, 20). • Structure of Chapters 2 & 3 must be based on individual FDM sectors (EEB 11, 12). Reformulate Chapter 4 and incorporate issues in sector descriptions (EEB 13, 18, 19, 21, 25). • The structure of the BREF should be based on a "Family BREF" type of structure, i.e. each important FDM sector shall be treated separately (FI 6). Short and easy-to-understand descriptions of the main processes and the most important related key environmental impacts of each FDM sector should be given (FI 7, 8). • A subsectoral structure would make the BREF more user-friendly for both operators and regulators (FEDIOL 1; FEFAC 3; FDE 55, 56, 58). • The description of end-of-pipe techniques in chapter 4 should follow a sectorial approach (FEDIOL 28, 29). • Keep common general issues such as management, general principles of monitoring and develop chapters for sectors (FR 13). Waste water treatment is based on the same types of classical techniques and could be dealt with in a common chapter (FR 14). • Shorten general descriptions of techniques where they are not relevant for BAT and permits (DE 62). • Keep the current structure for the starch sector (AAF 1). • A focused and individual BREF for the processed meat sector should be developed (CLITRAVI 42). • Include a subsection for the animal feed sector (ES 18). • Dehydration of materials should be described as an individual sector (FR 15). • Cleaning should be a part of the description of the specific product processes (EEB 5, 19).
New information identified
<ul style="list-style-type: none"> • No new information identified at this stage.
EIPPCB assessment
<ul style="list-style-type: none"> • To serve its main purpose and ensure its user-friendliness, the content of the BREF should focus on the relevant information for enabling the determination of BAT and the associated environmental performance levels. • A BREF does not need to include very general information on the food sector. • The BREF should focus on key environmental issues and consider only those products and processes and candidate BAT that relate to these issues. • The current FDM BREF follows the structure indicated in the table of the BREF Guidance Section 2.2 with the following chapters:

- General information about the sector concerned (Chapter 1)
 - Applied processes and techniques (Chapter 2)
 - Current emission and consumption levels (Chapter 3)
 - Techniques to consider in the determination of BAT (Chapter 4)
 - Best available techniques (BAT) (Chapter 5)
 - Emerging techniques (Chapter 6)
- The **applied processes and techniques chapter (Chapter 2)** of the current BREF is divided into two sections, one which describes unit operations and another describing the application of the unit operations in some of the major individual FDM sectors.
 - In the reviewed FDM BREF, the unit operations could be described solely under and related to the relevant FDM sectors. However, there would be unit operations which are shared by a majority of the installations. In order to avoid repetition and to optimise the chapter it could be efficient to also maintain a general description of some commonly used unit operations e.g. cleaning.
 - The **current Chapter 3 on consumption and emission levels** in the FDM BREF reports very scarce overall consumption and emissions data for the FDM sector, limited consumption and emissions data for some individual unit operations and consumption and emissions data of varying detail for some individual FDM sectors.
 - The purpose of this chapter is to provide a basis for understanding the environmental impacts of the production illustrated by the range of currently observed emission and consumption levels. Therefore it would be more useful to present separately data from individual sectors for production processes and installations that are better suited to being grouped together. However, it would be beneficial for the data for some major cross-cutting issues like water and energy consumption to be presented in a general comparative section.
 - The current **Chapter 4 on techniques to consider in the determination of BAT** in the FDM BREF provides information in a three-tier approach on techniques applicable to all or some of the FDM sectors and also on individual sector-specific techniques.
 - There is a general lack of a link between the extensive sections on end-of-pipe techniques and the emissions from a process in a specific sector, while prevention and reduction techniques related to the actual production process are most often better related to a particular FDM sector and/or product. With a review of the techniques presented in Chapter 4, and with a focus on the technical considerations relevant to the applicability, cross-media effects and relevant environmental performance and operational data, it become clear whether to either group a technique within a specific sector or as a generally applicable technique (i.e. applicable in all sectors).
 - In Chapter 4 a range of techniques is described for individual unit operations. These techniques are mainly different process technologies, which can have very limited applicability, since they are related to the quality and nature of the final product. It should be carefully considered whether it is relevant to explicitly include specific manufacturing processes as BAT candidate techniques.
 - Applying a particular manufacturing process could create specific environmental issues, which are better described in Chapter 2 as information on processes, in addition to data concerning the performance of the process presented in Chapter 3. The distinction between processes and techniques is clarified in the BREF Guidance Sections 2.3.5 and 2.3.7. Techniques are used to prevent or reduce the emissions and consumption of the installation/plant.
 - Some techniques in Chapter 4 are described but not selected as BAT (and are therefore not included in the BAT conclusions). The descriptions should at least contain the necessary data and information to support the reasoning for not including the technique as BAT.

New activities

- Partially described or missing activities and processes should be updated throughout the BREF chapters and be based on the data and information collection.

EIPPCB proposal

- To keep the overall structure given in the table of the BREF Guidance, Section 2.2.
- To develop separate descriptions of widely applied production processes, including variations in processing techniques and referring to unit operations for all FDM sectors in Chapter 2 and with related data in Chapter 3, as long as these processes will affect the environmental performance.
- To include general descriptions of some utility operations and general processes such as cleaning in Chapter 2 and provide related data in Chapter 3.
- To maintain a clear distinction between processes and techniques as indicated in the BREF Guidance in Sections 2.3.5 and 2.3.7.
- To keep a three-tier approach for Chapter 4 on "Techniques to consider in the determination of BAT":
 - general common prevention and reduction techniques;
 - common descriptions for applied prevention and reduction techniques applied in more than one sector;
 - prevention and reduction techniques applicable to individual FDM sectors.
- TWG members to submit information on insufficiently covered and new activities.

2.4.2 Unit operations and their relevance in the BREF**Summary of initial positions**

- Remove ageing process (D14) (ANIA 50, FDE 13, 42, spiritsEUROPE 4, 8).
- All the mentioned unit processes mentioned in the call for positions do not need to be covered in detail since no environmental issue can be identified or is already covered in the ENE or ICS BREFs (UK 19, FDE 59).
- Detailed descriptions of production techniques should be restricted to those related to an environmental issue (UK 11).
- Unit operations and production techniques within a specific sector that do not directly impact on environmental parameters should be included only if they provide additional relevant information. (CLITRAVI 40, 46).
- Maintain detailed description of production techniques (RO 7).
- Include descriptions of other and innovative new products/processes, e.g. betain extraction, succinic acid, to focus on innovation (ANIA 3, ATLA 18).
- The unit process F.2 Drying should be a separate sector (SNFS 2, UNGDA 1, 6).
- Standard operations in current BREF Chapter 3.1 should not be included separately but should be a part of the specific sector description (EEB 8).

New information identified

- No new information identified at this stage.

EIPPCB assessment

- Chapter 2 of a BREF, which describes the applied processes and techniques, should cover those process variants, developing trends and alternative processes to the extent that they are relevant for the determination of BAT, see BREF Guidance Section 2.3.5.
- In the call for TWG positions, a number of unit processes described in the current BREF were identified for inclusion in the document in Chapters 2 and 3 but without any clear reference to a related environmental issue or any technique in Chapter 4.
- The unit processes in question are often an integral part of a production process and could still be described in Chapter 2 as a part of the general description of sequential steps in a manufacturing unit in the relevant sector.
- Even though a process step or a unit process does not play a direct role in generating air emissions for example, the process step or unit process is still a part of the total

manufacturing process. At the same time it is beneficial to also mention in the BREF that a unit process is not considered the source of a key environmental issue.

- New innovative products and production processes could be mentioned in the BREF. Some products might be more related to the valorisation of food residues. Inclusion of new products should only be developed beyond Chapter 2 if there is a clearly identified related environmental issue and if the production or innovative product group is not already covered in another BREF.
- Sectors in the current BREF are divided according to the product range and to the main raw material used. Drying takes place in various sectors and makes use of different techniques. Even though drying has a common purpose differences between sectors should be taken into account.

EIPPCB proposal

- To keep all unit processes, but including the description as far as possible under the relevant sector descriptions.
- To keep drying as a specific unit process, but to include it under each of the relevant sectors.
- TWG members to provide information on innovative products and the related manufacturing process to assess their inclusion in at least Chapter 2.

2.4.3 BAT conclusions structure

Summary of initial positions

- BAT conclusions should be divided into individual sectors (EEB 34, CLITRAVI 2; EDA 1; RO 12).
- Change the structure of the BAT conclusions; apply a better separation of BAT for the whole sector and BAT for single or just a few sectors (DE 32).
- The structure of the BAT conclusions should be divided into sectors and should follow the revised structure of the BREF (DK 13).
- Use a structure that facilitates the identification of BAT per manufacturing process (ES 16, 88).
- A sectorial structure to Chapter 5 would make the BREF more user-friendly for both operators and regulators (FEFAC 6; FDE 71).
- Restructure BAT conclusions according to priority sectors. The sector-specific element should reflect priority sectors identified in Chapters 2, 3 and 4, however the cross-cutting BAT information currently included in Chapter 5.1 should be retained (UK 15).
- Develop further the sector-specific BAT conclusion structure and add more sectors (EEB 36).

New information identified

- No new information identified at this stage.

EIPPCB assessment

- BAT conclusions are presented in a single chapter in each BREF. They are published in the Official Journal of the European Union as a Commission Implementing Decision after adoption through the IED Article 75 Committee.
- The current BAT conclusions need to be revised in order to reflect the standard structure of a BAT conclusion, which has changed since the introduction of the IED and which is described in the BREF Guidance (Chapter 3). This will mean a major restructuring of the presentation of the BAT conclusions. The main change would be that a conclusion should have an environmental objective which is missing in the current BREF.
- It is expected that specific BAT conclusions for individual sectors would be derived based on the outcome of the data and information collection step.

- On the other hand, it is also expected that there still will be cross-cutting conclusions applicable to all sectors.
- General BAT conclusions with generally applicable techniques and associated environmental performance levels should be derived if evidence from the data collection shows performances not correlated to sector specificities.
- The current structure does already reflect an approach towards specific sectors. It is expected that more developed descriptions of techniques in Chapter 4, especially concerning applicability and environmental performance, will help determine BAT for each sector and hereby support a clearer sector structure.

EIPPCB proposal

- To update the current BAT conclusions to fit the standards of the BREF Guidance.
- To maintain general BAT conclusions for common issues.
- To include and further develop, where appropriate, sector-specific BAT conclusions.

3 ITEMS NOT FOR DISCUSSION AT THE KICK-OFF MEETING

The European IPPC Bureau considers that the items covered in Sections 1 and 2 of this Background Paper deal with the most important issues to be discussed by the TWG members at the KoM.

The TWG's initial positions on other items are included in this section of the background paper, but it is proposed not to discuss these at the TWG KoM.

A position belonging to the following categories has been placed in this Section 3, when:

- it refers to techniques and their performance or applicability, which will be assessed in the following step of the review itself;
- it debates what is, or what is not, BAT and how to formulate the BAT; this is also not the main purpose of the discussions at the KoM;
- it refers to horizontal, methodological or procedural issues that have already been agreed at the appropriate level (e.g. IED Article 13 Forum, IED Article 75 Committee);
- it is related to minor items, such as formatting issues, typos or unclear positions.

At the same time it should be mentioned that positions including those that are placed in this section will be taken into consideration for the drawing up of the first draft. In the collection of positions there are very valuable contributions and promises to provide even more exact information for updating, especially Chapter 4. One item in Section 3 “exchange of information on potential BAT” covers the task of how to follow up on the large number of suggestions made by the TWG members reported in this section.

Candidate techniques, environmental performances and BAT will be discussed at a later stage of the review process, when the data needed to assess any changes in the BAT conclusions of the original BREF have been submitted by members of the TWG, and when these have been verified, commented on and discussed.

However, if a TWG member considers that any of the following items in this chapter deserves discussion at the KoM, they **are invited to indicate this to the FDM BREF review team by e-mail at JRC-IPTS-EIPPCB-FDM@ec.europa.eu before 17 October 2014**. This will then allow us to allocate sufficient time for the discussion of these items. Such an indication must also contain a justification/rationale.

3.1 Identification of BAT

Summary of initial positions
<ul style="list-style-type: none"> • Transparency concerning evaluation of techniques to be BAT (BE 2). • Delete too general BAT that are not relevant for writing permits. In the existing BAT conclusions a lot of BAT are kept very general and thus are not relevant for a permit. A lot of BAT are already covered by implementing an EMS or could be included in more superior BAT, like management systems (DE 31; DK 15). • The current BAT chapter should be entirely reviewed since it contains more "general best practices" than BAT (FR 28). • Derive AELs only when information includes comparable data sets (same units, same methods, etc.) (ES 49). • Develop a tool to quantitatively evaluate the different techniques, establishing specific thresholds above which this technique cannot be considered BAT (ES-AND 113). • Economic viability must be an important decision maker for selected BAT in case of existing plants (DE 44). • BAT conclusions have to be usable and feasible and described on a solid basis with reliable data. They should be presented in an understandable and comprehensible manner (DE 28; ANIA 17; ATLA 8). • The starting point for determining BAT for on-site waste water treatment, where the discharge is direct to a water course, should be based on what conventional secondary treatment can achieve along with the assimilative capacity of the receiving water. The latter should also be part of the determination process (FDE 66).
New information identified
<ul style="list-style-type: none"> • The BREF Guidance for the exchange of information under the IED (Decision 2012/119/EU). • "Methodology for determining emission levels associated with the best available techniques for industrial waste water", in Journal of Cleaner Production 29-30 (2012), p. 113-121. • SCI paper: Methodology for selection of best available techniques (BAT) at the sector level; Roger Dijkmans; Journal of Cleaner Production - J CLEAN PROD 01/2000; 8(1):11-21.
EIPPCB assessment
<ul style="list-style-type: none"> • The process of determining BAT and BAT-AEPLs will follow the general framework given in the following documents: <ul style="list-style-type: none"> ○ The BREF Guidance (Decision 2012/119/EU) ○ IED Annex III ○ The Standard Texts preface ○ The ECM REF. • The information and data collection will be the main tool to identify the BAT and relevant BAT-AEPLs in the BAT conclusions in the revised FDM BREF. • The information and data used to this end should be fully identifiable and traceable in the remaining chapter of the revised FDM BREF and mainly concentrated in Chapter 4. • The original submitted questionnaires should be accessible on BATIS to ensure transparency. • The assessment and the conclusions rely entirely upon the data and information received in the information exchange arranged for each individual TWG. This opens the possibility to give consideration to different sectors in an appropriate way. The approach used to draft the BAT conclusions is described in the Preface of the BREF and this text has been agreed by the IED Article 13 Forum as standard text for all BREFs, whereas the format and content of BAT conclusions are laid down in Commission Implementing Decision

2012/119/EU.

- Draft 1(D1) of the revised FDM BREF will contain draft BAT conclusions which should be commented on by the TWG (e.g. on applicability, economical constraints, technical information). This is the normal course of action suggested in the BREF Guidance (Decision 2012/119/EU).

EIPPCB proposal

- To follow the BREF Guidance for the exchange of information under the IED (Decision 2012/119/EU) and the EIPPCB work programme agreed at IED Article 13 Forum meetings of June and September 2013.

3.2 Information on production processes and general consumption data

3.2.1 Process descriptions – current Chapter 2

Summary of initial positions
<ul style="list-style-type: none"> • Several process descriptions should be added/updated, e.g. final cooling in production of cooked ham (2.2.1.2) (CLITRAVI 59), e.g. waste water source: osmosis purge (ES 26), e.g. add more meat processing techniques (ES 30; CLITRAVI 51), e.g. add other frying techniques besides deep frying (ES 50, 70; CLITRAVI 54) and the description of the fermentation process and distillation process (FDE 11, 12). • The use of ethanol to disinfect the cheese curd before entering the storage room should be described and the related techniques to reduce the ethanol emissions to air (SE 6). • Split coffee section so there is a clear distinction between coffee and instant coffee (DE 66). • Update process data and description for cold stabilisation in the drinks sector (ES 103) and for pressure filtration (ES 102).
New information identified
<ul style="list-style-type: none"> • No additional information provided at this stage.
EIPPCB assessment
<ul style="list-style-type: none"> • All the information provided, and any further information collected via the data and information collection, will be used to update the descriptions of processes in Chapter 2.
EIPPCB proposal
<ul style="list-style-type: none"> • TWG members will provide updated information on the specific processes covered in the scope by the deadline given for the information collection, see Section 2.3.

3.2.2 Consumption and emissions data – current Section 3.3

Summary of initial positions
<ul style="list-style-type: none"> • Data from non-verified sources or of questionable quality in the current BREF should be deleted, e.g. Sections 3.3.1.2.2, 3.3.1.3.1 (ES 29, 31; CLITRAVI 50, 52). • Specific amendments and text improvements in process descriptions are proposed in Section 3.3 (DE 23, 71, 72, 74, 75; ES 27; CLITRAVI 29). • General update of tables and figures in Section 3.3 (DE 73), especially Table 3.55 (composition of cheese manufacturing waste water) (DE 25; VDM/MIV 6), and Table 3.61 (consumption of chemicals in European dairies) (DE 26; VDM/MIV 7), and Table 3.58 (production and disposal of solid wastes from some Nordic dairies (DE 27; VDM/MIV 8) and remove tables based on single Member States (DE 64; VDM/MIV 1) and update air emissions section for oilseed processing to include diffuse and fugitive emissions (FEDIOL 7; FDE 29). • Present all data per sector (FDE 57).
New information identified
<ul style="list-style-type: none"> • No additional information provided at this stage.
EIPPCB assessment
<ul style="list-style-type: none"> • According to the BREF Guidance, the review of a BREF should include the updating and complementing of old background information with more recent data.

- Data in the current Chapter 3 are not always traceable and therefore need an update.
- Data in Chapter 3 have a more general perspective on the sector and are generally not based on an actual consumption and emissions data collection. Moreover, some reported data would be more adequately placed in Chapter 4 in relation to specific techniques.
- Consumption and emissions data need to reflect the key environmental issues for each sector.

EIPPCB proposal

- The update of Chapter 3 will be based primarily on the general installation-specific data collection, see Section 2.3.
- Additional relevant information should be provided by the TWG.

3.3 Specific proposals on BAT and BAT conclusions

Summary of initial positions

General

- Current emission levels for waste water should only be reference values and not BAT-AELs, since they are based on expert judgement and not data (PT 6)
- Current emission levels in Section 5.1.6 in the current BREF for waste water are too general (PL 12) and good examples should be taken into consideration (EEB 37) and sector-specific values set instead (UNGDA 3).
- State clearly whether the technique, data or information refers to only one of these types (channelled, diffuse or fugitive) or else state clearly that it refers to the sum of all these types (FDE 24; FEDIOL 4) and which should also be reflected in the BAT conclusions (ES 17).
- Rewrite Section 5.1 in the current BREF and transfer information concerning non-enforceable issues, e.g. performance of an EMS, to EMAS BEMP Document (EEB 37).
- The BAT-AELs must be determined in intervals to reflect the variation due for instance to seasonal differences, fluctuations in daily/weekly production and technology performance etc. (FI 16; CLITRAVI 45).
- BAT conclusions should not refer to or cover issues already covered in other legislation, e.g. BAT 5.1.21 and BAT 5.1.4.7 (1) (EDA 11, 12).

Specific BAT, BAT-AEPL and BAT-AEL

Emissions to air

- Keep cyclones and the BAT-AEL on wet dust emissions from oilseed production (ES 39; ANIA 39; FDE 87; FEDIOL 31).
- Dust emissions below 10 mg/Nm³ cannot always be achieved, e.g. for lactose (EDA 40; VDM/MIV 27)
- Keep cyclones and update with other techniques if applicable and revise the BAT-AEL on wet dust emissions from oilseed production (ES 39; ANIA 39; FEDIOL 31).
- Maintain the specific BAT-AEPL for achievable energy generation during hardening (BAT Section 5.2.4) (ES 64; ANIA 44; FEDIOL 36, FDE 23).
- Set BAT-AEL for TOC to air for washing columns to 110 mg/m³ as in French regulation (UNGDA 7).
- Revise water consumption figures regarding the dairy sector (IE 8).

Emissions to water

- The BAT-AEL of 10 mg/l for TN should be higher because of fluctuations during the year (ANIA 13) or should be revised (FR 33).
- Remove limit for phosphorus for emission to water from dairy activities since not obtainable (ANIA 37; ATLA 16) or not relevant (VDM/MIV 5).
- Table 5.1 has to be modified for N and P with the comment: 'It is not always possible or cost-effective to achieve the total nitrogen and phosphorus levels shown, in view of local conditions or local reuse'; and set different reference values depending on the final use of the waste water, e.g. for irrigation (ES 95; FI 4; PL 36; ANIA 7; ATLA 24; CEFS 6; FDE 4, 39; SNFS 5; UNGDA 5) and because of regional climatic conditions (SE 13).

Specific conclusions

- Maintain current BAT 3 and 4 for oilseed processing (Section 5.2.4) (ES 64; ANIA 44; FDE 23; FEDIOL 36).
- Revisit the applicability of CO₂ recovery from fermentation (BAT 5.2.9.1) and consider that this might be applicable only to breweries (DE 90; FR 39) and exclude from the distilling sector (ANIA 48; FDE 15; spiritsEUROPE 6).
- BAT 5.1.4.2 on centrifugation is not useful and should be deleted if not followed by an achievable reduction of waste by sectors/products (DE 38).
- Keep surrogate monitoring for bag filters (FEFAC 5; FDE 70).

- Suppress current technique 1 in BAT 5.1.4.7 or create coherence with legislation on authorised cooling agents (FR 29).
- Suppress current technique 1 in BAT 5.1.4.9 since present in EU regulation on eco-design (ANIA 19; ATLA 13).
- Revisit the cleaning conclusions 9 and 14 and the related techniques in BAT 5.1.3. Biocides also have negative effects (DE 35, 36).
- Revisit the applicability of the general use of heat pumps (DE 40).
- Delete BAT 5.1.4.1 (materials reception or despatch) or incorporate in good housekeeping (DE 37).
- Revise principles of energy efficiency, e.g. use of combined heat and power generation should be an option only when it is economically efficient, or it could be referred to the ENE BREF in general (PL 28).
- Delete the BAT giving preference to pressed sugar pulp (FR 38).
- Delete BAT concerning collaboration with upstream and downstream activities (supply chain management) (DE 34)
- Revise BAT 5.1.6 14: bromide compounds should also be avoided, add to cross-media effects that not only chlorine compounds can form disinfection by-products but also bromine compounds. (DE 43, 110).
- Reformulate 5.1.6 on treatment of sludge since it is unclear (ANIA 17).
- Update BAT on compressed air systems concerning principles of efficient operation (PL 30).
- Revise BAT 5.2.9 since either too specific or applicability too limited (PL 38, 39, 41, 42)
- Several techniques are not applicable or used for dairy sector (ANIA 16, 31, 32, 33, 34; ATLA 4, 6, 7, 10).
- Add turbidity measurements as BAT (PL 6).
- Rearrange techniques relating to integrated measures for oilseed processing (BAT section 5.2.4) (DE 46; ES 19; UK 42; ANIA 38; FEDIOL 30) and rewrite and restructure the descriptions in Chapter 4 (DE 11).
- Not only physical refining is BAT and should not be based on FFA % only (BAT section 5.2.4) (DE 49; ES 61; ANIA 41; FEDIOL 33; FDE 20).
- Expand the BAT selection for deodorisation in oil refining (BAT section 5.2.4) (DE 51; ES 63; ANIA 43; FDE 22; FEDIOL 35)
- The requirements regarding the certification of the environmental management system should be deleted (PT 4; ANIA 15; ATLA 32; EDA 41; FDE 46).
- Add BAT for the prevention of emission of substances that deplete the ozone layer, like in Section 5.1.4.7 of the current BREF (DE 39).
- Define more BAT for vegetable oil refining (ES 61; FR 35; ANIA 41; FEDIOL 33).
- Additional BAT for dairies should not be divided into subgroups (specialised plants). Some equivalent data might be used (PL 34).

Candidate BAT in Chapter 4

New candidate techniques

- Add 3-stage drying as BAT candidate technique in milk powder production (amend Section 4.7.5.8) (PL 16) and more modern techniques (DE 124; EDA 31; VDM/MIV 4, 30).
- Add solar drying of pressed sugar beet pulp as BAT (DE 57; ES 96; FI 5; PL 37; ANIA 27; CEFS 7; FDE 5; SNFS 7).
- Include technique of use of sugar factory lime for agriculture in Chapter 4 (IT 9).
- Consider reuse of residues from production processes, e.g. economy of natural resources: N, P, K and organic matter contained in the sugar plant effluent can be returned to agriculture (IT 17).
- Include the technique “LTLT (Low Temperature Long Time / slow Cooking / sous Vide)” under preservation in cans, bottles and jars (ES 71).
- Add the technique ultra-high pressure pasteurisation (ES 100).

- Add “pre-flash” as BAT for physical refining of edible oils (IT 6).
- Add more techniques in wine-making (ES-CAT 106).
- Add more techniques under cleaning (UK 45, 46, 47).
- Add techniques and BAT for remote containment (SE 1; UK 22).
- Add the use of spent diatomaceous earth from beer production (DE 23, 75).
- Add description of techniques for dust-free handling, e.g. in breweries handling kieselguhr and other filtration aids.
- Add description of extending stack height and the use of accelerator cones for dispersing low intensity odours (CLITRAVI 76; FDE 80, 81)

Obsolete or not available techniques

- Use of binary ice in cooling is not applied in the sector (ES 68, 69, 77).
- Using Reverse Osmosis to remove salt from whey is too costly and not BAT (EDA 29)
- Since cheese ripening is recipe-driven, the technique in Section 4.7.5.14.8 cannot represent BAT (EDA 30; VDM/MIV 40).
- Reuse of treated waste water is very limited, e.g. in dairy sector and not available due to food safety criteria (ANIA 30; EDA 43).
- Delete technique 4.7.5.7 in current BREF, since clarification equipment needs cleaning anyway (DE 123; PL 15; EDA 21; VDM/MIV 34).
- FAT standardisation is not BAT. Batch standardisation is often more precise and used in some processes (DE 122; EDA 20; VDM/MIV 33).
- Omit variable speed drive as BAT since it is considered old technology (DE 97; ES 51; FEDIOL 12)
- Delete ultrafiltration (4.7.5.14.1) since it is related to product quality and not environmental performance (DE 128; EDA 25; VDM/MIV 38)

Techniques described in current BREF

- Proposals for amendments on applicability, cross-media effects and descriptions in several specific techniques in Chapter 4 and how these are described in Chapter 5, and especially to distinguish between the applicability for different sectors (DE 76, 78, 85, 86, 87, 89, 91, 92, 93, 94, 95, 96, 98, 107, 119, 120, 121, 126, 133, 134, 135; ES 27, 61, 65, 68, 69, 70, 72, 73, 74, 76, 78, 79, 80, 81, 82, 83, 84, 86; FR 35; IE 9; PL 5, 7, 8, 9, 10, 11, 14; ANIA 16; ATLA 4, 5, 10; CLITRAVI 29, 37, 55, 56, 62, 67, 68, 69, 70, 73, 74, 75, 76, 77, 78, 79; EDA 5, 9, 10, 13, 14, 15, 17, 18, 19, 23, 26, 27, 36; FDE 82, 88, 90; FEDIOL 11, 33; VDM/MIV 10, 11, 12, 14, 17, 19, 20, 21, 23, 24, 25, 26, 29, 31, 32, 33, 36, 37, 39).
- Update description of applied odour abatement techniques (SE 11).
- Include general descriptions for optimising resource efficiency (CLITRAVI 15).
- Update Section 4.2.13 on energy generation and consumption since it lacks depth (ES 75). Concerning energy generation, take into consideration fuels other than natural gas, e.g. production residues (ES 99).
- Revise Table 4.6 (DE 81; EDA 7; VDM/MIV 16) and the applicability of pinch technology (DE 82; EDA 8; VDM/MIV 17).
- Include new section in Chapter 4 covering other management techniques, e.g. focus on reducing variations as management system (EEB 16).
- Add a step 0 (Section 4.1.6) in order to raise awareness through visualisation of emissions and consumption (DE 79; EDA 6; VDM/MIV 15)
- "Real-time measurement" should be mentioned as the most efficient measurement in step 7 (Section 4.1.6) (PL 4) and for main processes (DE 83; VDM/MIV 18).
- Update waste water treatment Section 4.5 with new techniques (PL 13) and update sector-specific waste water data (ES 22; FI 2; PL 12; ANIA 9; ATLA 26; CEFS 4; FDE 3, 67; SNFS 4; UNGDA 3) and e.g. for cheese making (EDA 28) and update Section 4.5.4 on tertiary treatment (DE 108, 111).
- Update descriptions in general on cleaning (SE 9) and “cleaning in place” techniques with focus on optimising CIP (UK 45, 46, 47) and update CIP techniques (DE 102) and add and update alternatives to pigging and update cross-media effects for pigging (DE 99, 100;

EDA 16; VDM/MIV 26).

- Reassess cyclones, since they can be used as stand-alone equipment in several sectors (CEFS 3; FDE 2, 65; FEFAC 4).
- Focus on the techniques (for example use of chloride-free detergents) to remove AOX from the waste water (BE 8).
- Focus on techniques to minimise waste water load, e.g. using biodegradable detergents (BE 14).
- Because pressed and dried sugar pulps are different products, it is a market decision which one is produced. All sugar beet pulp drying and pressing techniques are BAT and should be equally considered (ES 96; FI 5; PL 37; ANIA 27; CEFS 7; FDE 5; SNFS 7) and add selling of pressed pulp as BAT (DE 56) and review the BAT regarding techniques for dry pulp (FR 38).
- Restructure and update sections on refining on oil 4.7.4.7 to 4.7.4.12 in order to follow a logical process flow and update with operational data (DE 11, 12, 13, 14, 15; ES 20; FEDIOL 18, 21, 22, 24, 26).
- The current description of centrifugation/separation only affects milk separation, expand to include other sectors if possible (DE 38).
- Update in general BAT descriptions for dairies, Section 4.7.5 in the current BREF (DE 127, 128, 129, 130; ATLA 5; EDA 24; VDM/MIV 30, 31, 32, 33, 34, 35, 36, 37, 38, 39), and consider e.g. application of membrane technology: reverse osmosis recovery of first flush milk and CIP chemical recovery (UK 49).
- Update section on dust emissions in the dairy industry, so it is more focused and differentiates between products (DE 10).
- Update in general BAT descriptions for cheese making, Section 4.7.5 in current BREF and consider use of nanofiltration to produce concentrated whey permeate and reverse osmosis for water recovery and reduced BOD loading to effluent (UK 48).
- Restructure in general Section 4.7.2 concerning fish and shellfish so it follows the actual processing (DE 9).
- Update description for lowering emissions to air from brewing (DE 103).
- Collect and update information on roaster types in Section 4.7.8 (DE 132) and actual use of biofilters (DE 131).

New information identified

- Studies concerning the benefits of the application of sugar factory lime to agricultural soil can be made available within the TWG (IT).
- For updating Section 4.2.13, the EnergiWiki.dk is referred to.
- Best available techniques for wine and cava making (ES, in Catalan)
- Germany will contribute information on the dust-free handling of filter aids in the brewing industry.

EIPPCB assessment

- BAT conclusions will be discussed and agreed on at the final TWG meeting.
- The BREF Guidance (Chapter 3) provides the framework on how to express BAT conclusions.
- In the process of reviewing a BREF, one of the key tasks is to update the BAT candidate techniques and their actual performance in order to review the content of the BAT conclusions. However, this will depend on the information and data exchanged in the subsequent steps of the review work and can therefore only be discussed later on in the process.
- It is therefore necessary to provide any relevant new techno-economic information/data to support any change to the BAT chapter and the TWG is invited to do so through the data and information collection.
- This new information will be reflected in the first draft (D1) of the revised BREF.
- The initial positions given at this moment provide a very good starting point for identifying the changes that the TWG will have to consider and take into account.

- In order to further build on the detailed comments on specific techniques and on specific conclusions received, the EIPPCB will prepare a draft list of the techniques already mentioned in the current BREF including a reference to the TWG members that have submitted specific proposals.
- The TWG proposals should be followed by a more detailed description following the standard 10-heading structure for describing a BAT candidate, see also BREF Guidance Section 2.3.7.

EIPPCB proposal

- TWG members to provide rationales and further information using primarily the standard 10-heading structure for describing a BAT candidate, see also BREF Guidance Section 2.3.7., and EIPPCB to update the chapter.
- To take the detailed comments received on specific techniques and on specific conclusions into account when preparing the first draft of the reviewed FDM BREF.

3.3.1 Land spreading

Summary of initial positions

- Maintain land spreading as BAT, e.g. for starch effluents, for sugar and canned goods also (AAF 11; ANIA 8, 26; ATLA 25; CEFS 5; EDA 42, FDE 40).
- Land spreading for starch effluent could be considered as BAT (DE 53).
- In some cases, land spreading is the best solution for agronomic use of sugar plant effluent (ES 91; FI 3; FR 31; PL 35; SNFS 6), but the applicability should be described (DE 54; FI 16; IT 17).
- Land spreading of water is an efficient technique to be considered along the WWTP. BAT is to implement a “land spreading plan” with the monitoring of the following parameters: N, P and K (UNGDA 4).
- Land application of organic materials from the FDM sector is an essential BAT to allow recovery of significant waste streams (PL 24).
- Land spreading of liquid side streams/waste waters/wastes is not a general BAT (FI 17).

New information identified

- Data from specific French plants will be provided. Contribution on French practices concerning land spreading.

EIPPCB assessment

- Land spreading is briefly described in the current FDM BREF under Section 4.1.6. as a general technique for prevention and reduction of waste sent for disposal or treatment.
- Additional relevant information would be essential for assessing the applicability in the FDM sector and to include the technique as a BAT candidate technique.
- Concerning the process of land spreading itself, issues such as nutritional benefits to plants and monitoring requirements about the predicted effect are outside the scope of the FDM BREF.

EIPPCB proposal

- TWG members to provide additional relevant information from the sectors where land spreading is applied as a technique for handling process residues/waste.

3.4 Other than normal operating conditions (OTNOC)

<p>Summary of initial positions</p> <ul style="list-style-type: none"> • Design the sugar-specific questionnaire taking into account the 'other than normal operations' (avoiding start-up data being used in AEL derivation, etc.). Include fields to collect information to determine the specific 'OTNOC' for sugar. Data likely to include campaign durations, energy use efficiency, description of equipment (CHP, back pressure steam turbines) (ES 46).
<p>New information identified</p> <ul style="list-style-type: none"> • No new information identified at this stage.
<p>EIPPCB assessment</p> <ul style="list-style-type: none"> • 'Normal' and 'other than normal' operating conditions or incidents are important concepts to define, since BAT-AELs are applicable under normal operating conditions. The 'other than normal' operating conditions (OTNOC) should be identified, as described in the BREF Guidance, Section 4.6.2.2. • OTNOC are referred to in the IED, Art. 14 point 1 (f), as, but not limited to, start-up and shut-down operations, leaks, malfunctions, momentary stoppages and the definitive cessation of operations. • The data collection should primarily represent the performance under normal operating conditions. If data also represent OTNOC this should be clearly indicated and explained with the consequence that some of the data cannot be used for further assessment. • Description of FDM specific OTNOC should be included in the revised BREF and BAT conclusions may also be proposed, when the duration, character and frequency of OTNOC are considered of major concern with respect to environmental protection.
<p>EIPPCB proposal</p> <ul style="list-style-type: none"> • TWG members to submit within the general deadline for the data and information collection additional information on OTNOC, which could further assist the definition or description of OTNOC to be included in the BREF. A specific template will be provided for this. • To collect information on OTNOC related to the individual BAT through the template for collecting information on potential BAT and on emerging techniques, see also Section 2.3.2.

3.5 Definitions of terms used in the FDM BREF

Summary of initial positions
<ul style="list-style-type: none"> • Make the distinction between "waste" and "by-products" (CLITRAVI 30). • Include definition of by-product in accordance with EU Waste Framework Directive 2008/98/EC (ANIA 47; FDE 9, 10; spiritsEUROPE 5; UK 44). Review term "waste milk" (EDA 39, VDM/MIV 13). • Clarification on "animal by-product" needed (CLITRAVI 28, 31; ES 8, 67; FR 45). • A definition of "capacity" should be given (DE 8). • Harmonized definition of "distillation" should be given (FDE 8; spiritsEUROPE 10). • Add definition of wet dust and sticky dust, e.g. maximum dust moisture (ES-CAT 105). • Harmonise definition of all pollutants, e.g. refer to EN standards (DE 16, ES 45, AAF 6, ANIA 2, ATLA 19, FDE 35, 93). • Naming of products used for animal feed should be in line with regulations (DE 84, ES 90, FEDIOL 27). • Update in general the section on definitions (IT 5), e.g. "exhausted pomace" should be substituted with "defatted pomace".
New information identified
<ul style="list-style-type: none"> • Regulation 68/2013/EC on the catalogue of feed materials. • Regulation 110/2008/EC. • EU Spirit Drinks Regulation.
EIPPCB assessment
<ul style="list-style-type: none"> • Generally, definitions of general terms should be consistent with those used in other BREFs. • Updating the FDM BREF Glossary is a part of the review process and should take into account new standard definitions used in other BREFs and improve definition for some technical wordings. • Waste is defined in Directive 2008/98/EC. For the sake of clarity in the FDM BREF, there should be a distinction between waste and production residues. Some of these residues are waste according to a common waste definition or a national definition. Some production residues are considered animal by-products, but can also be waste. Production residues from the primary product are mostly further processed to other food or animal feed products. • A definition of animal by-products is given in Regulation (EC) No 1069/2009 of the European Parliament and the Council, laying down health rules as regards animal by-products and derived products not intended for human consumption. • When a pollutant is described and used in the BREF, it should be defined in the Glossary and if used in the BAT conclusions it should also form part of the list of definitions and acronyms present in the introductory part of the BAT conclusion chapter. If necessary, the definition of a pollutant could be further refined by preferably including a reference to an EN standard. • Specific naming of animal feed using definitions already determined in other regulations would be useful. • Definitions already present in the IED should not be repeated in the FDM BREF. • During the review, it would be beneficial to receive suggestions for new definitions needed in order to better/update the FDM BREF and Glossary.
EIPPCB proposal
<ul style="list-style-type: none"> • To update the FDM BREF Glossary and the list of definitions in the BAT conclusions. • To use the terms "waste", "by-products" and "production residues" as appropriate and define these in the Glossary. • To define unambiguously the pollutants mentioned in the BREF and to add the most

appropriate standard definition of these.

- Further definitions for new and existing terms should be proposed by the TWG by posting suggestions onto BATIS during the information collection period.
- To add in the Glossary of the FDM BREF the definition of animal by-products which is given Regulation (EC) No 1069/2009 of the European Parliament and the Council, namely:

'animal by-products' means entire bodies or parts of animals, products of animal origin or other products obtained from animals, which are not intended for human consumption, including oocytes, embryos and semen.

3.6 Minor corrections/spelling errors/small updates/other items

<p>Summary of initial positions</p> <ul style="list-style-type: none"> • Correct wording in some sentences, table texts and cross references (DE 68, 69, 77, 125; ES 104; EDA 22; FEDIOL 5, 10; FDE 25, 30; VDM/MIV 35). • Update references to legislation, e.g. the former VOC directive now IED (DE 70; FDE 26; FEDIOL 6), e.g. Existing Substances Regulation 793/93/EEC now REACH VO (1907/2006/EG) and CLP (DE 88; VDM/MIV 22, 28) and for olive oil to Regulation 1308/2013 (IT 7) and Regulation (EU) 528/2012 concerning the making available on the market and use of biocide products (DE 101, 109). • Correct and clarify that phosphorus is not a hazardous substance, Section 4.5.4.4 in current BREF (ANIA 36; ATLA 12).
<p>New information identified</p> <ul style="list-style-type: none"> • Regulation (EC) No 1907/2006. • Regulation (EC) No 1272/2008. • Regulation (EU) No 528/2012. • Regulation (EU) No 1308/2013.
<p>EIPPCB assessment/proposal</p> <ul style="list-style-type: none"> • EIPPCB to update and amend references to other legislation and to correct obvious wrong wordings.

4 Annexes

ANNEX I: Proposal of scope for the FDM BREF

This document concerns the following activities specified in points 6.4 (b) and (c) of Annex I to Directive 2010/75/EU:

6.4 (b) *Treatment and processing, other than exclusively packaging, of the following raw materials, whether previously processed or unprocessed, intended for the production of food or feed from:*

- (i) *only animal raw materials (other than exclusively milk) with a finished product production capacity greater than 75 tonnes per day;*
- (ii) *only vegetable raw materials with a finished product production capacity greater than 300 tonnes per day or 600 tonnes per day where the installation operates for a period of no more than 90 consecutive days in any year;*
- (iii) *animal and vegetable raw materials, both in combined and separate products, with a finished product production capacity in tonnes per day greater than:*
 - *75 if A is equal to 10 or more; or,*
 - *[300 - (22.5 × A)] in any other case,*

where 'A' is the portion of animal material (in percent of weight) of the finished product production capacity.

Packaging shall not be included in the final weight of the product.

This subsection shall not apply where the raw material is milk only.

(c) *Treatment and processing of milk only, the quantity of milk received being greater than 200 tonnes per day (average value on an annual basis).*

This document also covers the following activities, to the extent that they are directly associated with the activities specified in points 6.4 (b) or (c) of Annex I to Directive 2010/75/EU:

- the loading, unloading and handling of raw materials;
- the temporary storage of raw materials;
- upstream and downstream activities directly associated with the production process (e.g. cleaning and disinfection, freezing and refrigeration);
- combustion plants, in which the products of combustion are used directly in the production process (e.g. drying of sugar beet pulp, roasting coffee).

This document does not address the following:

- activities that do not use animal or vegetable raw materials;
- slaughterhouses and dedicated animal by-product processes, i.e. rendering; fish-meal and fish oil production; blood processing and gelatine manufacturing;
- manufacture of non-food or non-feed products, such as soap, candles, cosmetics, pharmaceuticals;
- the selection of packaging materials;
- waste water treatment plants, for which the main pollutant load originates from other activities (e.g. from a slaughterhouse or chemical production);
- urban waste water treatment plants covered by Council Directive 91/271/EEC;
- upstream activities such as agriculture;
- combustion plants which are not process-integrated, including where energy is used for steam generation, indirect heating or electricity generation only.

Interface with the SA BREF

The “Slaughterhouses and animal by-products BREF” (SA BREF) covers the slaughtering of animals, its directly associated activities and a wide range of animal by-products treatment activities. The “slaughtering” activity is considered to end with the making of standard cuts for large animals and the production of a clean whole saleable carcass for poultry.

Therefore, this document (FDM BREF) does not cover the production of primary products produced from animal by-products, such as rendering and fat melting; fish-meal and fish oil production; blood processing and gelatine manufacturing.

Packaging

This document covers the environmental impacts of packing activities which take place within an FDM installation, but provides only generic descriptive information on packaging materials, as the selection of those materials in food industries is strongly dependent on non-environmental criteria, e.g. food safety requirements.

Other reference documents

This document is designed to be as comprehensive as possible, taking into consideration the need to avoid duplication with other BREFs. It contains information specific to the Food, Drink and Milk sector, while generally applicable information on storage, cooling systems, energy efficiency, monitoring, or economics and cross-media effects may not have been developed or covered in the present document.

Other reference documents which are relevant for the activities covered by this document are the following:

Reference document	Activity/Subject
Cement, Lime and Magnesium Oxide Manufacturing Industries (CLM)	Production of lime within a sugar plant
Common Waste water and Waste gas treatment (CWW)	Common waste water and waste gas treatments in chemical industry production.
Economics and Cross-Media Effects (ECM)	Economics and cross-media effects of techniques
Emissions from Storage (EFS)	Storage and handling of fuels and additives
Energy Efficiency (ENE)	General energy efficiency techniques
Industrial Cooling Systems (ICS)	General cooling techniques
Large Combustion Plants (LCP)	Combustion plants which are not process-integrated and with a total rated thermal input of 50MWth or more
Large Volume Organic Chemical Industry (LVOC)	Production of ethanol
Monitoring of Emissions to Air and Water from IED-installations (ROM)	Monitoring of Emissions to Air and Water from IED-installations (ROM)
Slaughterhouses and Animals By-products Industries (SA)	Slaughterhouses and animal by-products
Waste Treatment (WT)	Anaerobic digestion of waste

Relevant is also the Sectoral Reference Document (SRD) on best environmental management practices (BEMPs) regarding food and beverage manufacturing, under the provisions of EMAS Regulation (Regulation (EC) 1221/2009). This document mainly focuses on small medium enterprises and environmental impacts from the whole life cycle (upstream and downstream in the 'value chain').

The scope of this document does not include matters that only concern safety in the workplace or the safety of products, because these matters are not covered by the Directive. They are discussed only where they affect matters within the scope of the Directive.

ANNEX II: Proposal for the structure of the revised FDM BREF

Preface

Scope (of the BREF)

1. General information about the FDM sector

2. Applied processes and techniques

2.1 Common processes and techniques applied in the FDM sector (The indicated subsections are only examples at this stage)

- 2.1.1 Materials reception and preparation
- 2.1.2 Energy generation and consumption
- 2.1.3 Water use and consumption
- 2.1.4 Cleaning and disinfection (updated version of current)
- 2.1.5 Packing and packaging
- 2.1.6 Freezing and refrigeration
- 2.1.7

2.2 Processes and techniques applied in individual FDM sectors

(Individual sectors are further split into main product groups as appropriate. The indicated sectors and products groups are only examples at this stage. For each sector or product group, a section referring to the associated key environmental issues will be included. Each sector description will be based on the description in the original FDM BREF, but need to be updated and restructured based on the information collection.

- 2.2.1 Meat and poultry
 - 2.2.1.1 Canned meat
 - 2.2.1.2 Cooked ham
 - 2.2.1.3 Smoked meat products
 - 2.2.1.4.....
 - 2.2.1.5 Key environmental issues
- 2.2.2 Fruits and vegetables
 - 2.2.2.1 Fruit juice
 - 2.2.2.2 Tomatoes
 - 2.2.2.3
 - 2.2.2.4 Key environmental issues
- 2.2.3 Vegetable oils and fats
 - 2.2.3.1 Seed oil
 - 2.2.3.2 Olive oil
 - 2.2.3.3
 - 2.2.3.4 Key environmental issues
- 2.2.4 Dairy products
 - 2.2.4.1 Milk and dairy products
 - 2.2.4.2 Cheese
 - 2.2.4.3 Milk and whey powder
 - 2.2.4.4
 - 2.2.4.5 Key environmental issues
- 2.2.5

3. Current emission and consumption levels

3.1 Emissions and consumption of individual FDM sectors *(data and information will be presented for an identified key environmental issue in a sector. The individual sectors presented are only indicative.)*

- 3.1.1 Meat and poultry
 - 3.1.1.1 Raw materials and chemicals consumption
 - 3.1.1.2 Energy consumption
 - 3.1.1.3 Water consumption
 - 3.1.1.4 Emissions to air
 - 3.1.1.5 Emissions to water
 - 3.1.1.6 Generation of waste and by-products
 - 3.1.1.7 Noise
- 3.1.2 Fruits and vegetables
 - 3.1.2.1 Raw materials and chemicals consumption
 - 3.1.2.2 Energy consumption
 - 3.1.2.3 Water consumption
 - 3.1.2.4 Emissions to air
 - 3.1.2.6 Emissions to water
 - 3.1.2.6 Generation of waste and by-products
 - 3.1.2.7 Noise
- 3.1.3 Vegetable oil and fats
 - 3.1.3.1 Raw materials and chemicals consumption
 - 3.1.3.2 Energy consumption
 - 3.1.3.3 Water consumption
 - 3.1.3.4 Emissions to air
 - 3.1.3.5 Emissions to water
 - 3.1.3.6 Generation of waste and by-products
 - 3.1.3.7 Noise
- 3.1.4 Dairy products
 - 3.1.4.1 Raw materials and chemicals consumption
 - 3.1.4.2 Energy consumption
 - 3.1.4.3 Water consumption
 - 3.1.4.4 Emissions to air
 - 3.1.4.5 Emissions to water
 - 3.1.4.6 Generation of waste and by-products
 - 3.1.4.7 Noise
- 3.1.5

4. **Techniques to consider in the determination of BAT** *(information related only to the processes will be moved to Chapter 2; primary prevention techniques will be kept here)*

- 4.1 General common techniques
 - 4.1.1 Environmental management tools
 - 4.1.2 Selection, reception, handling and storage of materials
 - 4.1.3 Production management techniques
 - 4.1.4 Process control techniques
 - 4.1.5 Cleaning and disinfection
 - 4.1.6 Freezing and refrigeration
 - 4.1.7 Noise
 - 4.1.8
- 4.2 Commonly applied treatment techniques
 - 4.2.1 Air emissions treatment
 - 4.2.1.1 Treatment techniques
 - 4.2.1.2 Air emissions treatment in individual sectors

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- 4.2.2 Waste water treatment
 - 4.2.2.1 Pre-treatment techniques
 - 4.2.2.2 Final treatment techniques
 - 4.2.2.3 Sludge management
 - 4.2.2.4 Waste water treatment in individual sectors
 - 4.2.3
 - 4.3 Techniques applicable to individual FDM sectors (*process-integrated techniques, e.g. for reducing energy consumption and emissions to air and water, sectorial-specific techniques for waste reduction, co-products and by-product management*)
 - 4.3.1 Meat and poultry
 - 4.3.2 Fruits and vegetables
 - 4.3.3 Vegetable oil and fats
 - 4.4.4 Dairy products
 - 4.4.4
 - 5. **Best available techniques (BAT) conclusions** (*see Annex II for the structure of BAT conclusions*)
 - 6. **Emerging techniques** (*modified and adapted version of current BREF Chapter 6*)
 - 6.1 Common techniques
 - 6.2 Techniques to consider in individual FDM sectors
 - 6.2.1 Meat and poultry
 - 6.2.2 Fruits and vegetables
 - 6.2.3 Vegetable oil and fats
 - 6.2.4 Dairy products
 - 6.2.5
 - 7. **Concluding remarks and recommendations for future work** (*current BREF Chapter 7*)

ANNEX III: Proposal for the structure of the BAT conclusions of the revised FDM BREF

The example below shows a possible structure for laying out the BAT conclusions. BAT-AELs may be given either in the general section and/or in a section related to a specific treatment, depending on the information arising from the data collection. Additional parameters (e.g. pollutants) can be introduced or removed based on the collected information. The data collection can also help identify different categories in the emissions/consumption performance of treatment plants (e.g. age, size, input waste, treated dispatched material).

BEST AVAILABLE TECHNIQUES

Scope

Definitions

General considerations

Reference conditions

5.1 General BAT conclusions (*applicable to all installations in combination with the specific BAT conclusions, but applicability restrictions may apply in specific cases*)

- 5.1.1 Environmental management systems
- 5.1.2 Monitoring
- 5.1.3 Cleaning and associated water consumption
- 5.1.4 BAT for some processes commonly applied in a number of FDM sectors but that are not an integral part of a production process (e.g. reception, handling and storage of materials, freezing and refrigeration)
- 5.1.5 Emissions to air
- 5.1.6 Emissions to water and water consumption
- 5.1.7 Noise and vibrations
- 5.1.8 Odour
- 5.1.9

5.2 BAT conclusions for individual FDM sectors (*Additional BAT conclusions for individual FDM sectors are expected to be derived. These BAT conclusions apply in addition to the general BAT conclusions. The selection of such individual FDM sectors would be based on the outcome of the data collection step. Further specific BAT conclusions across a FDM sector, e.g. additional BAT for cheese production, will be based on the same criteria. These additional BAT conclusions could be related to various issues, such as monitoring, emissions to water and water consumption, waste generation and residues*).

5.3 Description of techniques

ANNEX IV: Number of IED installations

In the letter of the EIPPCB (dated 16/04/2014) for the expression of the TWG members' initial positions for the review of the FDM BREF, the EIPPCB specifically asked for information on the number of FDM installations covered by the IED operating in each Member State.

Eight Member States (DK, FI, FR, IE, PL, RO, SE and the UK) provided information divided between sectors. Two Member States (DE and BE) provided a total number for the relevant activities in Annex I to the IED. In these 10 Member States, according to the submitted information, there are around 1 700 FDM installations under the scope of the IED.

Based on the provided information, the following table shows the distribution of the number of installations in the different FDM sectors as reported by the 10 Member States. Another 245 installations in DE were reported under the activity 6.4 b) unspecified.

Sector	Number of installations in 10 MS
Dairy and activities covered by 6.4 c	459
Animal feed	291
Meat and poultry	191
Grain mill products	89
Sugar	63
Fruits and vegetables, fruit juice	86
Brewing	70
Convenience food/ready meals	39
Vegetable oils and fats	37
Fish and shellfish	32
Soft drinks	24
Starch	20
Confectionery	11
Distilled beverages	9
Bread	4
Wine	5
Dry pasta	1

It should also be mentioned that for some sectors (e.g. coffee, and olive mills) no information was provided. For wine, dry pasta, soft drinks and ready meals only one or two MS reported installations.

Member States reported to the Commission in 2011 on the number of IED installations under each of the activities listed in Annex I to the IED. The correspondence between the overall reported number in 2011 and the number reported by the 10 Member States to the EIPPCB were close to 100 % for the 6.4 b) activities and 90 % for the 6.4 c) activities. The 10 Member States represent 60 % of the 6.4 b) activities and 75 % of the 6.4 c) activities reported in 2011. The list of reported installations under the IED from 2011 is considered as giving a good indication of the total number.

The estimated total number of installations with 6.4 b) activities is therefore around **2 100**, and around **600** installations belonging to activity 6.4 c). It is notable that animal feed constitutes 25 % of the reported installations with an estimated number around 500.

Information was also provided by three industrial organisations (ANIA, FEFAC and spiritsEUROPE). The information and figures have confirmed the information and numbers received from Member States.

ANNEX V: Proposal for parameters for BAT-AELs and averaging periods in the revised BREF

Waste water emissions

BAT-AELs should be developed for TOC, COD, TSS, TN and TP and if possible as generic BAT-AELs, while taking the specific sector into consideration.

BAT-AEL should be expressed as a daily average in concentration and a yearly average in specific mass load except for campaigns, but will depend on the data collected.

For campaigns a monthly average of the specific mass load could be feasible instead of a yearly average.

A daily average can be based on 24-hour flow proportional sampling taken either every day (continuously) or taken at another reasonable interval.

The key parameters and the additional parameters to be included in the data collection is shown for the main sectors identified in Section 2.2.

Sector	Relevance of parameters in some sectors					Collection of supporting data
	COD	TSS	TN	TP	TOC	BOD and NH ₄ -N for all sectors
Meat	y	n	y	y	y	And oil and grease, TSS
Fish	y	n	y	n	y	And oil and grease, TSS, TP
Fruit/vegetables	y	y	y	y	y	-
Dairy sector	y	y	y	n	y	And TP
Oilseed/olive oil	y	y	y	y	y	-
Starch	y	y	y	y	y	-
Grain mills	y	y	y	y	y	-
Sugar	y	y	y	y	y	-
Animal feed	y	y	y	y	y	-
Brewing	y	y	y	y	y	-
Coffee (instant)	y	y	y	y	y	-
Distilled beverages	y	y	y	y	y	And Cu

Emissions to air

BAT-AELs should be developed for channelled emissions to air of dust, VOC, NO_x and CO, while taking the specific sector into consideration.

The BAT-AEL should be expressed as a short term average and a yearly average in specific mass load except for campaigns, but will depend on the data collected.

For campaigns a monthly average of the specific mass load could be feasible instead of a yearly average.

The following table summarise the proposals for parameters in specific sectors in Section 2.2.7.

	Dust	VOC	NO_x	CO
Meat	n	Smoke kilns	n	n
Fish	n	Smoke kilns	n	n
Fruit/vegetables	n	n	n	n
Dairy sector	Drying of powder products	n	n	n
Oilseed/olive oil	Raw material preparation	Several sources	n	n
Starch	Drying	n	n	n
Grain mills	Milling and drying	n	n	n
Sugar	Pulp drying	Pulp drying	Directly heated pulp drying (combustion flue gas)	Directly heated pulp drying (combustion flue gas)
Animal feed	Drying, milling	?	Directly heated dryer	Directly heated dryer
Brewing	Milling, material handling	n	n	n
Coffee	Drying	Roasting	Roasting	Roasting
Distilled beverages	Milling, material handling	n	n	n